



Leader in
Level Measurement

Installation and Operating Instructions

IntelliPoint RF Series Point Level Switch

NOTICE: *The AutoVerify™ feature in The IntelliPoint™ switch is shipped DISABLED. For critical High Level applications we recommend enabling the AutoVerify™ feature. See Section 2.6.6*

Telephone: 1 215-674-1234
Fax: 1 215-674-2731
E-mail: drexelbrook.service@ametek.com
Website: www.drexelbrook.com

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IntelliPoint RF Series Point Level Switch



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An ISO 9001 Certified Company

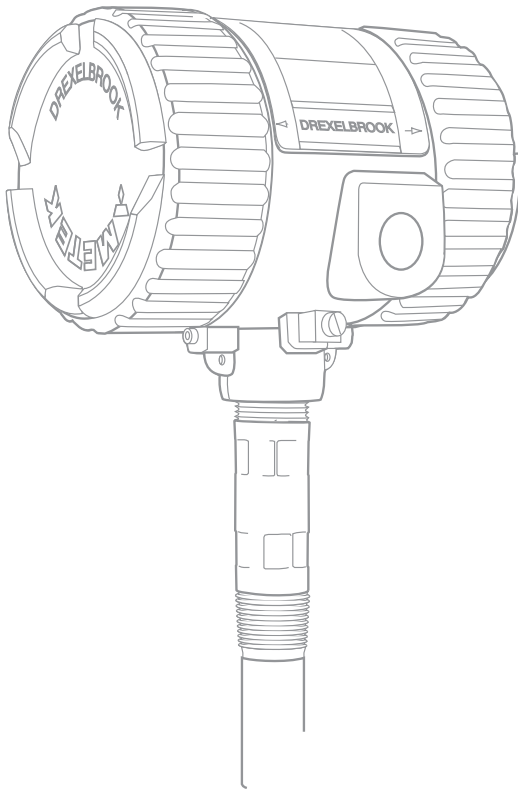
205 Keith Valley Road, Horsham, PA 19044
Telephone: 1 215-674-1234
Fax: 1 215-674-2731
E-mail: drexelbrook.service@ametek.com
Website: www.drexelbrook.com

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Section 1

Section 1: Introduction

1.1 System Description

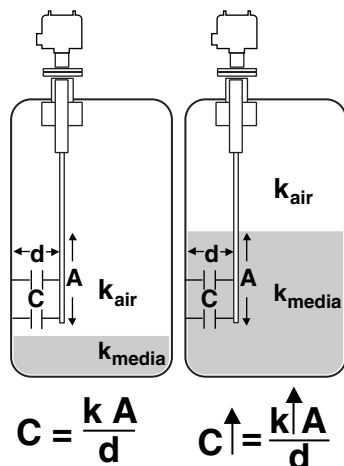


Figure 1-1
Simple Capacitance Probe
(Insulating Media Shown)

The AMETEK Drexelbrook **IntelliPoint™** Series uses **No-Cal™** technology to detect the presence or absence of material without calibration or initiation via setpoint adjustments, push-buttons, or magnets.

Installation is simple and easy. Simply apply power and IntelliPoint system is ready to detect the presence or absence of material. Since IntelliPoint instrument does not require calibration or setpoint adjustments, it is capable of operating in non-dedicated tanks regardless of the material being measured.

Notice: Material to be Measured Must Be Below Sensor when Power is Applied.

The **AutoVerify™** self-testing function continuously monitors the entire system to ensure proper operation. **Manual Certify™** changes the outputs in order to test the loop current and ensure proper operation of the control systems.

1.2 Technology

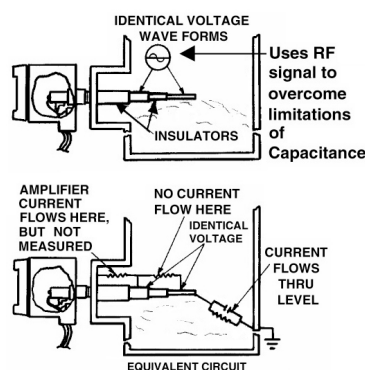


Figure 1-2
RF Admittance Probe
with Cote-Shield

In a simple capacitance probe-type sensing element, when the level rises and material covers the probe, the capacitance within the circuit between the probe and the media (conductive applications) or the probe and the vessel wall (insulating applications) increases. This is due to the dielectric constant (k) of the material, which causes a bridge mis-balance. The signal is demodulated (rectified), amplified, and the output is increased. There are drawbacks, however, especially when there is coating of the probe.

An RF Admittance level transmitter is the next generation. Although similar to the capacitance concept, IntelliPoint employs a radio frequency signal and adds the Cote-Shield™ circuitry within the Electronics Unit.

This patented Cote-Shield™ circuitry is designed into the IntelliPoint series and enables the instrument to ignore the effect of buildup or material coating on the sensing element. The sensing element is mounted in the vessel and provides a change in RF admittance indicating presence or absence of material.

The Cote-Shield element of the sensor prevents the transmission of RF current through the coating on the sensing element. The only path to ground available for the RF current is through the material being measured.

The result is an accurate measurement regardless of the amount of coating on the probe, making it by far the most versatile technology, good for very wide range conditions from cryogenics to high temperature, from vacuum to 10,000psi pressure, and works with all types of materials.

1.3 Model Number

● Technology					
R	RF Admittance				
● Measurement Type					
L	No Calib., 2 pF Fixed Preload	M	Manual Calibration	V	No Calib., 10 pF Fixed Preload
P	No Calib., 0.5 pF Fixed Preload (High Sensitivity)	G	Manual Calibration (High Sensitivity)		
● Input					
L	Universal Power Supply 21-100 VDC, 85-250 VAC, 0-400 Hz				
● Housing					
0	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries				
1	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries				
2	ATEX Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries				
3	FM / FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries				
5	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Perm-a-Seal sensors – only				
6	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only				
7	FM / FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only				
9	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
A	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
B	FM / FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
● Electronics					
0	Integral	7	Rmt. w/ (25 ft.) Tri-Ax Cable	E	Rmt. w/ (75 ft.) 1st 10ft Hi-Temp. Cbl.
1	Remote, no cable	8	Rmt. w/ (50 ft.) Tri-Ax Cable	F	Rmt. w/ (5 ft.) G.P. Cable
2	Rmt. w/ 3 m (10 ft.) G.P. Cable	9	Rmt. w/ (75 ft.) Tri-Ax Cable	G	Rmt. w/ (5 ft.) Tri-Ax Cable
3	Rmt. w/ 7.6 m (25 ft.) G.P. Cable	A	Rmt. w/ (10 ft.) Hi-Temp. Cable	H	Rmt. w/ (10 ft.) Tri-Ax Cable
4	Rmt. w/ 10.6 m (35 ft.) G.P. Cable	B	Rmt. w/ (25 ft.) 1st 10ft Hi-Temp. Cbl.	J	Rmt. w/ (35 ft.) Tri-Ax Cable
5	Rmt. w/ 15.2 m (50 ft.) G.P. Cable	C	Rmt. w/ (35 ft.) 1st 10ft Hi-Temp. Cbl.	K	Rmt. w/ (5 ft.) Hi-Temp. Cable
6	Rmt. w/ 23 m (75 ft.) G.P. Cable	D	Rmt. w/ (50 ft.) 1st 10ft Hi-Temp. Cbl.		
● Output					
1	Two SPDT Relays, relay #2 configured as alarm or fault (Min=100 mA / 12 VDC)				
2	Two SPDT Relay, gold plated contacts (Max 200 mA / 12 VDC)				
● Sensing Element					
	Application	Sensing Element	Pressure/Temperature	Wetted Parts	
00	General purpose	700-1202-001 remote 700-1202-021 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK	
01	Floating roof with cable attachment and brass bottom weight	700-1202-012 remote 700-1202-022 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS, Brass, and PEEK	
02	General purpose, longer insertion lengths with cable attachment and 316SS bottom weight	700-1202-014 remote 700-1202-024 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK	
03	Proximity	700-1202-018 remote 700-1202-028 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 76 mm (3) 316SS proximity plate	
04	General purpose, high temperature and pressure	700-1202-041 remote 700-1202-042 integral	69 bar @ 121°C (1000 PSI @ 250°F) 20.7 bar @ 232°C (300 PSI @ 450°F)	316SS and PEEK	
06	General purpose with FDA approved materials of construction	700-1202-031 remote 700-1202-032 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK	
07	General purpose Granular materials	700-1202-010 remote 700-1202-020 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 7/8 inch dia. 316SS collar	
09	General purpose Granular materials with FDA approved materials of construction	700-1202-033 remote 700-1202-034 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK with 7/8 inch dia. 316SS collar	
10	Corrosive liquids (2)(4)(9)	700-0001-018 remote	3.4 bar @ 149°C (50 PSI @ 300°F)	PFA	
11	General purpose, higher pressure TFE compatibility required	700-0201-005 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500psi @ 300°F)	316SS and TFE	
12	Corrosive material, higher pressure	700-0201-005 int/rem Hastelloy C	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500psi @ 300°F)	Hastelloy C and TFE	
14	General Purpose, low pressure	700-0202-002 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F)	316SS and TFE	
15	Heavy duty, agitated tanks or material with high bulk density (1)	700-0202-043 remote	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500psi @ 300°F)	316SS and TFE	
16	High Integrity Seal for Hazardous Materials	700-0002-360 int/rem	34.5 bar @ 149°C (500 PSI @ 300°F)	PFA	
18	Corrosive material, higher pressure with waterlike viscosity (4)	700-0001-022 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	TFE	
19	Interface Measurement	700-0002-023 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	316SS and TFE	
20	Miniature Pilot Plant Sensor (1)(7)	700-0209-002 remote	6.9 bar @ 121°C (100 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316 SS and TFE	

Continued on Next Page

1.3 Model Number (Continued)

Continued from Previous Page

Fly Ash Precipitators, Baghouse, and Economizers (1) (6)									
Application		Sensing Element	Pressure/Temperature		Wetted Parts				
31	No hopper Installation	700-0029-001 remote	0.1 bar @ 260°C (2 PSI @ 500°F)		316SS and TFE				
32	Hopper Installation up to 200mm (8 inches)	700-0029-002 remote	0.1 bar @ 260°C (2 PSI @ 500°F)		316SS and TFE				
33	Hopper Installation up to 406mm (16 inches)	700-0029-003 remote	0.1 bar @ 260°C (2 PSI @ 500°F)		316SS and TFE				
34	Hopper Installation up to 521mm (20.5 inches)	700-0029-004 remote	0.1 bar @ 260°C (2 PSI @ 500°F)		316SS and TFE				
35	Hopper Installation up to 635mm (25 inches)	700-0029-005 remote	0.1 bar @ 260°C (2 PSI @ 500°F)		316SS and TFE				
Plugged Chute Detection (1) (5)									
Application		Sensing Element	Pressure/Temperature		Wetted Parts				
50	Flush Mount Sensor 305mm ² (12 inches ²) heavy duty	700-0207-001 remote	0.1 bar @ 82°C (1 PSI @ 180°F)		304 SS and Polyurethane				
51	Flush Mount Sensor 305mm ² (12 inches ²) higher temperature	700-0207-002 remote	0.1 bar @ 149°C (1 PSI @ 300°F)		304 SS and TFE				
52	Flush Mount Sensor 305mm ² (12 inches ²) with curved radius 153, 229, 305 mm (6, 9, or 12 inches)	700-0207-003 remote	0.1 bar @ 82°C (1 PSI @ 180°F)		304 SS and Neoprene				
53	Flush Mount Sensor 305mm ² (12 inches ²) extra heavy duty	700-0207-004 remote	0.1 bar @ 82°C (1 PSI @ 180°F)		410 SS and UHMW Polyethylene				
55	Flush Mount Sensor 203mm ² (8 inches ²) heavy duty	700-0207-006 remote	0.1 bar @ 82°C (1 PSI @ 180°F)		304 SS and Polyurethane				
High Pressure / High Temperature									
60	High Pressure & Temp.	700-0204-038 remote	137.9 bar @ 93°C (2000 PSI @ 200°F)		316SS and Ceramic				
61	High Temperature	700-0204-002 remote	68.9 bar @ 260°C (1000 PSI @ 500°F)		316SS and Ceramic				
62	High Pressure & Temp.	700-0204-048 remote	275.8 bar @ 316°C (4000 PSI @ 600°F)		316SS				
ZZ Sensing Element Not Listed									
● Mounting Type (See separate Mounting Chart for first three digits)									
		IL	CSL			IL	CSL		
xxx1	457 mm (18")	152 mm (6")	xxxG	457 mm (18")	0 mm (0")				
xxx2	305 mm (12")	152 mm (6")	xxxH	914 mm (36")	254 mm (10")				
xxxA	152 mm (6")	51 mm (2")	xxxJ	914 mm (36")	0 mm (0")				
xxxB	305 mm (12")	51 mm (2")	xxxK	1219 mm (48")	254 mm (10")				
xxxC	305 mm (12")	89 mm (3.5")	xxxL	1524 mm (60")	254 mm (10")				
xxxD	457 mm (18")	51 mm (2")	P00X	IL/CSL Other					
xxxE	457 mm (18")	89 mm (3.5")	A1BX	IL/CSL factory set for Fly Ash					
xxxF	457 mm (18")	254 mm (10")	xxxZ	Other					
Notes: CSL (Cote-Shield Length) should extend through Nozzle + Typical "Wall Buildup" + 2 Inches									
(1) Available with remote electronics only					(6) Use A1B mounting option				
(2) Use A1P mounting option					(7) Use A8B mounting option (¼-inch NPT)				
(3) Choose only sanitary mounting options					(8) Choose from flange mounting only				
(4) Available with 0-inch CSL only					(9) FM approved with remote electronics only				
(5) Use P00X mounting option									
R L									
Not all mounting options available with all sensing elements									

1.4 Dual Compartment Housing

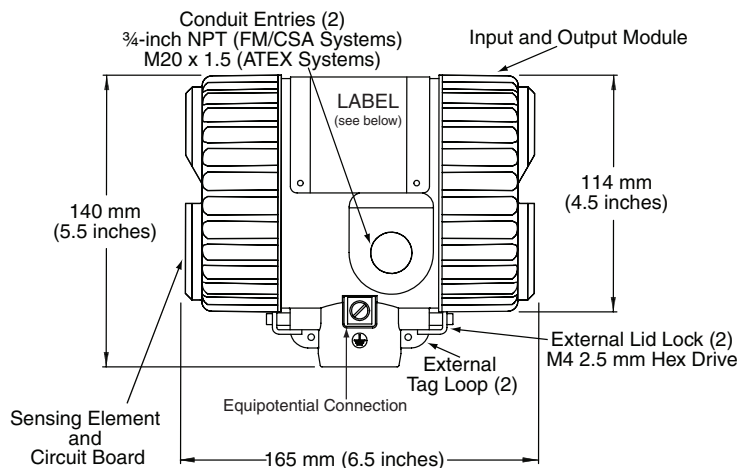
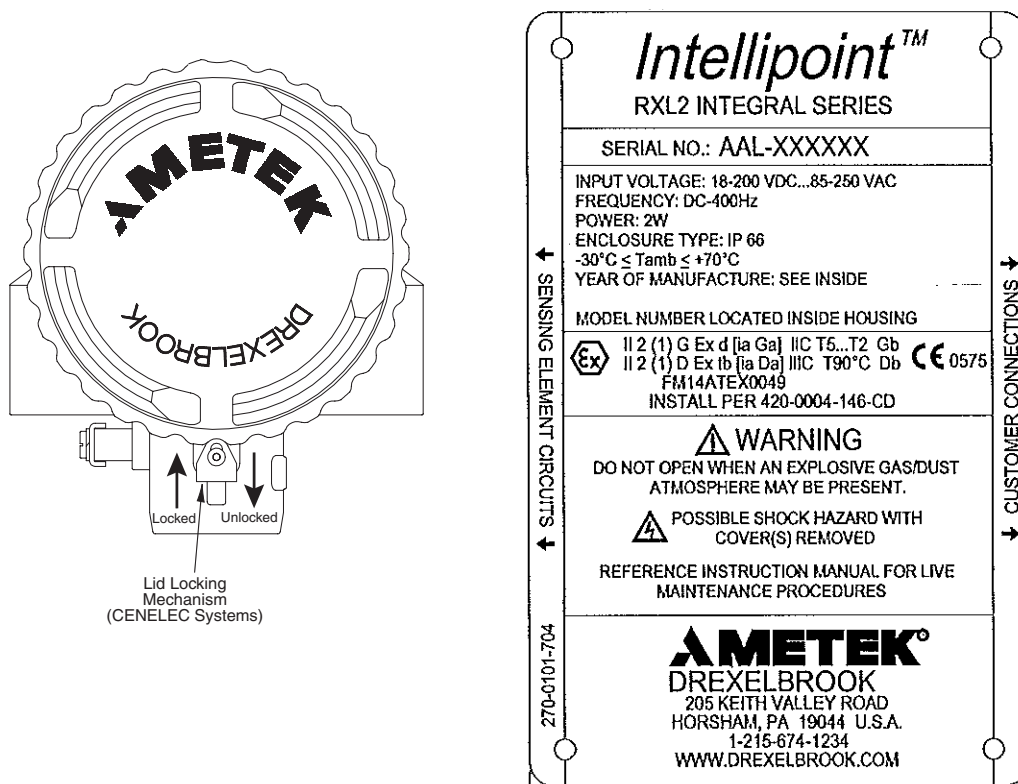


Figure 1-3
Dual Compartment Housing Detail



The Input/ Output Module (IOM) is located on Customer Connection side; sensing element/ circuit board are on opposite side.

1.5 Spare Parts List

O-ring	250-1-75
Housing ¾-Inch NPT Conduit Entry	260-2-540
Housing M20 Conduit Entry	260-2-542
Input/ Output Module.....	385-48-6
Input/ Output Module, Gold Relay	385-48-18
Circuit Board	
RLT - Standard Sensitivity Auto Cal	385-48-3-2
RPT - High Sensitivity Auto Cal.....	385-48-19-2
RMT - Standard Sensitivity Manual Cal....	385-48-10-2
RGT - High Sensitivity Manual Cal.....	385-48-20-2
Integral Sensing Element Cable	380-9000-97

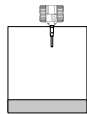
Section 2

Section 2: Installation

2.1 Unpacking

Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing material. If there is any shortage or damage, report it to the factory immediately.

2.2 Mounting and Installation Guidelines



CAUTION:

The IntelliPoint RF instrument must NOT be powered BEFORE it is installed in an application and material must be BELOW sensing element.

The IntelliPoint RF instrument can be mounted vertically, horizontally, or at an angle. Mounting location should be as free as possible from vibration, corrosive atmospheres, and any possibility of mechanical damage. Ambient temperatures at electronics should be between -30 to 70°C (-22 to 158°F).

The IntelliPoint RF instrument utilizes a dual compartment housing and a completely encapsulated input/ output module to reduce possibility that damage may occur from water migrating into housing through conduit. To further reduce possibility of damage caused by water in the conduit, install drip loop and breather drain to purge any accumulating moisture.

After system is installed and the level is **below** the sensing element, apply power. The RF series instrument does not require any calibration or setpoint adjustments and is ready to detect change in level.

If properly installed, the Green LED will illuminate when power is applied. The two Red LEDs should not be flashing. If either of the Red LEDs are flashing, refer to **Section 4: Troubleshooting**.



The Sensing Element / Circuit Board side of the IntelliPoint RF instrument is rated Intrinsically Safe (I.S.)



WARNING:

IntelliPoint RF equipment is rated explosion-proof. When installing in explosion-hazardous areas [rated “potentially hazardous” (EU) or “hazardous classified” (USA)] observe all national and local regulations as well as specifications in the certificate.

2.2 Mounting and Installation Guidelines (continued)

Mount sensing element using the following installation guidelines. Refer to Figure 2-1.

- When installing IntelliPoint RF instrument, ambient temperature at electronics must not exceed 70°C (158°F).
- When installing flange-mounted sensing elements, keep mating surfaces and bolts free of paint and corrosion to ensure proper electrical contact with vessel. Avoid using excessive amounts of Teflon™ tape when installing threaded sensing elements.
- Install systems with threaded NPT connection via wrench flats on the process connection **ONLY**.
- Locate sensing element to avoid enhancing electrostatic discharge from process medium, as is good practice with any thermowell, displacer, or sampler. This includes correct bonding to the tank or silo wall.
- If installation area is rated explosion-proof and requires conduit seal fittings, they should be used in accordance with company standards and local codes.
- Do not mount a Cote-Shield sensing element through a nozzle that exceeds length of first insulator.
- Ensure that there are no obstructions or agitator blades to interfere with sensing element.
- Rigid sensing elements can be mounted either vertically or horizontally.

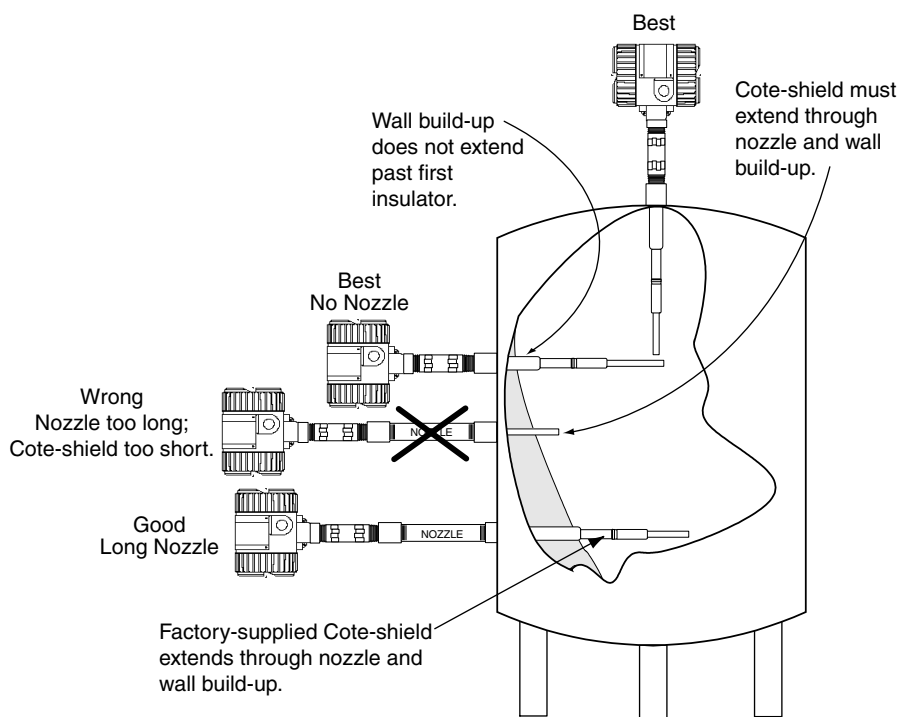
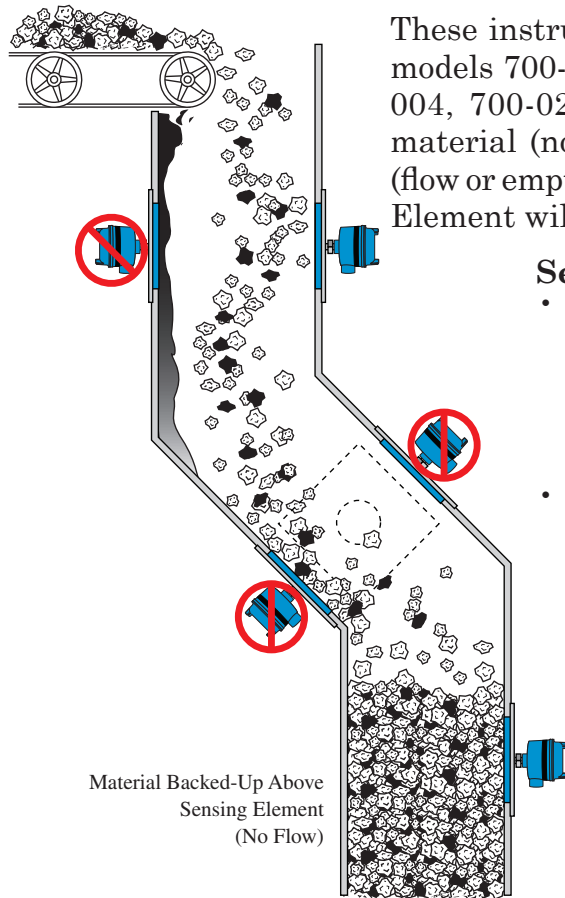


Figure 2-1
Installation Considerations

2.2.1 Installation of Flush-Mounted Sensing Elements



These instructions apply to all flush on/off sensing elements, models 700-0207-001, 700-0207-002, 700-0207-003, 700-0207-004, 700-0207-006. These systems will sense presence of material (no flow or plugged chute) and absence of material (flow or empty chute) at the sensing element. The Flush Sensing Element will ignore free falling material.

Sensing Element at the Top of a Chute.

- The flush sensing element should be mounted **In The Flow Stream**. These sensing elements are designed and built to withstand the impact of coal, rock, wood, chips, etc. This location is important to prevent excessive build up of material on the face of the sensing element.
- Excessive build up, typically consisting of wet and/or sticky fines, can occur if the sensing element is protected from falling material.

Sensing Element in an angle chute.

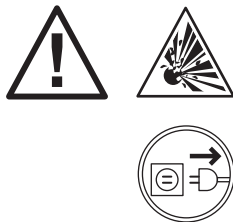
- Do not mount on the top or bottom.
- Best mounted on either side

Sensing Element at the Bottom

- Mount on any side.
- Low-Level sensors can be used to detect a plug or to insure that a seal is present (chute is full at this point).

2.3 Input Wiring

The IntelliPoint RF instrument utilizes a universal power supply and can be operated from any source between 85 to 250 VAC or 21 to 100 VDC. The universal power supply automatically detects the input voltage regardless of polarity and does not require jumper changes. To access, remove the housing lid on the **CUSTOMER CONNECTIONS** side to reveal the **INPUT/ OUTPUT MODULE (IOM)**. The IOM is an encapsulated assembly that contains the power supply, outputs and eight wiring terminals. The IOM is held in place with three screws. See Figure 2-2.



WARNING:

If The IntelliPoint instrument is located in a hazardous environment, do not open the enclosure cover or make/ break any electrical connections without first disconnecting electrical power at the source. Ensure that the wiring, electrical fittings, and conduit connections conform to electrical codes for the specific location and hazard level.

2.3 Input Wiring (Continued)

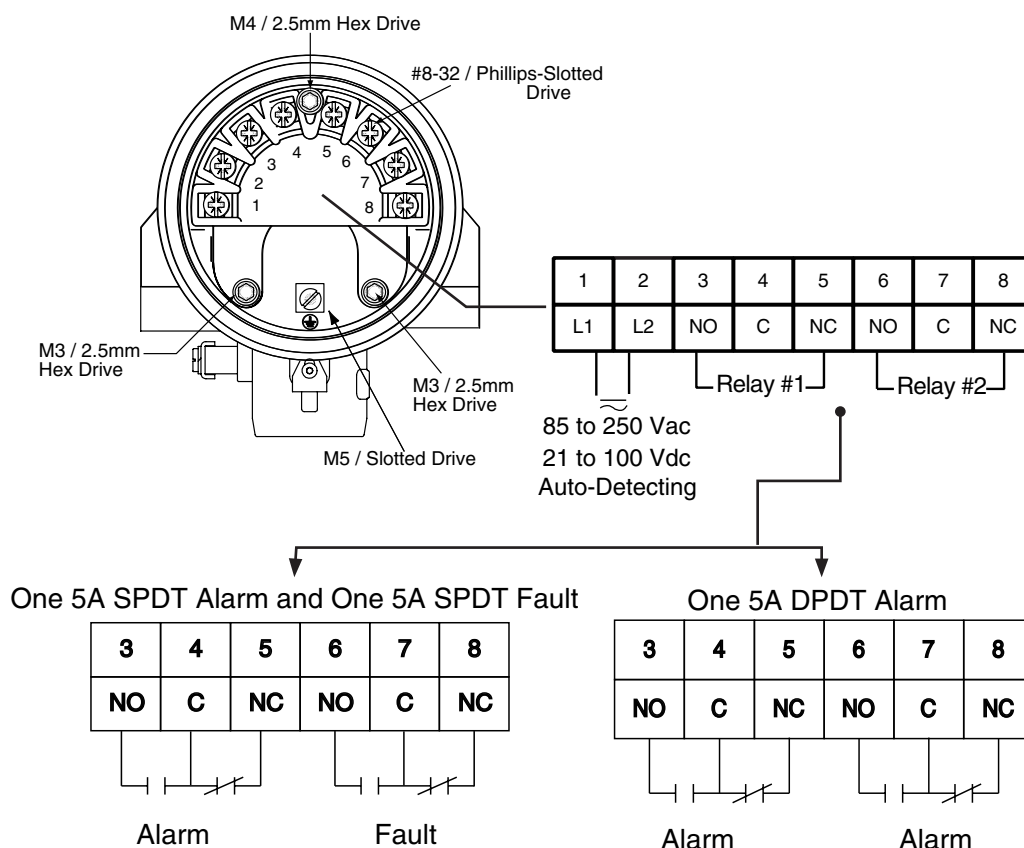


Figure 2-2

Input and Relay Wiring / Customer Connections Side



IMPORTANT

Ground Must be Provided for Proper Operation and Safety.

2.4 Output Wiring - Relay Version

The IntelliPoint RF series instrument is supplied with two sets of contacts. The relay contacts can be used as one of the following configurations depending on the RELAY #2 jumper configuration (see Figure 2.2 and 2.4)

- One 5A SPDT alarm relay and one 5A SPDT fault relay.
- One 5A DPDT alarm relay.

2.5 Spark Protection



Applications involving insulating granulars and insulating liquids may produce a static discharge that can damage the electronics. The RF series instrument is supplied with integral heavy-duty spark protection to prevent static discharges from damaging the electronic circuits.

2.6 Circuit Board

The circuit board is located on the sensing element/ circuit side of the housing (marked on label). Remove the housing lid to access the status LEDs, time delay adjustment, and configuration jumpers. See Figure 2-4.

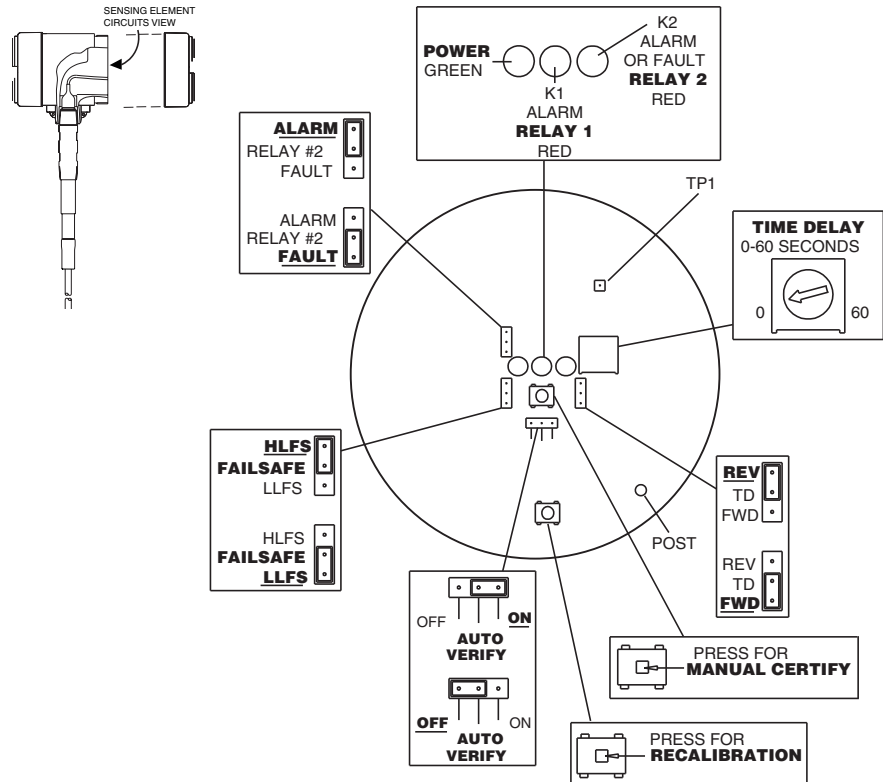


Figure 2-4
Circuit Board (shown in detail)



Do NOT push the Recal button without first ensuring that the material being measured is below the sensing element.

2.6.1 Time Delay

The **TIME DELAY** adjustment is located on the sensing element/ circuit board side of the housing. It is used to help stop an oscillating relay output due to agitation or waves in the vessel. The time delay adjustment can be field-adjusted from 0 to 60 seconds. The unit is shipped with the **TIME DELAY** setting at zero (0) seconds.



The Time Delay adjustment is a 270-Degree turn pot and is at zero seconds when in the full counter-clockwise position. Do not force the pot past the stop or damage will occur.

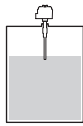
2.6.2 Time Delay Action

TIME DELAY ACTION describes whether the relay contacts are delayed from going into the alarm state or recovering from an alarm state.

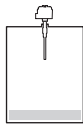
- **FWD:** delays system from coming out of alarm.
- **REV:** delays system from going in alarm.
- Instrument is supplied with **TIME DELAY** action set in forward mode (**FWD**) position.
- Time delay action is field-selectable using jumper located on sensing element/ circuit board side of housing.

2.6.3 Failsafe

FAILSAFE describes the level condition that causes the output relay to de-energize, and also the state of the relay upon loss of power.



- **High Level Failsafe (HLFS)** is condition when probe is covered. Relay will de-energize when level is high, indicating high level upon loss of power. (N.O. contacts open and N.C. contacts closed).



- **Low Level Failsafe (LLFS)** is condition when probe is uncovered. Relay will de-energize when level is low, indicating low level upon loss of power. (N.O. contacts open and N.C. contacts closed).
- Instrument is supplied with failsafe jumper set in high level (**HLFS**) position.
- Failsafe is field-selectable using a jumper located on sensing element/ circuit board side of housing.

2.6.4 Relay #2 Assignment

RELAY #2 assignment refers to operation of **RELAY #2**, and configures relays as (1) SPDT alarm and (1) SPDT fault relay or (1) DPDT alarm relay. **RELAY #1** is always an alarm relay.

- Alarm: **RELAY #2** will follow **RELAY #1**, providing a DPDT alarm relay.
- Fault: **RELAY #2** is used to indicate a fault when **AutoVerify™** self-test function is enabled. See Section 2.6.6
- Instrument is supplied with **RELAY #2** jumper set in alarm position.
- **RELAY #2** assignment is field-selectable using a jumper located on sensing element/ circuit board side of housing.

2.6.5 Manual Certify

The **Manual Certify™** test feature performs a confidence test of the system by duplicating the same signal as a high-level alarm condition without requiring the system to be removed from the tank.

- Simulating a high level with the Manual Certify feature:
- Checks AutoVerify™ and system circuits to ensure proper operation.
- Checks integrity and continuity of the wiring connections.
- Verifies that sensing element is working properly.
- Checks relay connections to other control devices.

The Manual Certify test is initiated with the press of the **Manual Certify Button** located on the sensing element/ circuit side of the housing. After pressing the button, the Green LED flashes for 5 seconds and the two Red LEDs illuminate. The relay contacts are moved to the alarm condition for 2 seconds. If the two Red LEDs do not light, and the relay contacts do not move to the alarm condition, the Manual Certify test has detected a fault. Consult the troubleshooting section of this Instruction Manual. Manual Certify is available when system is configured for **HLFS**.

2.6.6 AutoVerify



The AutoVerify™ feature in The IntelliPoint™ switch is shipped DISABLED. For critical High Level applications we recommend enabling the AutoVerify™ feature.

AutoVerify™ is a self-test function that continuously checks the system for proper operation when the unit is in the High Level FailSafe (**HLFS**) mode and in normal condition.

- **ON:** If fault is detected during AUTOVERIFY cycle, both relays will de-energize regardless of how relay #2 is assigned. If relay #2 is assigned to fault, user can distinguish between fault alarm and alarm caused by a high level in the tank.
- **OFF:** The AUTOVERIFY self-test function is not active.
- Instrument is supplied with AUTOVERIFY jumper set in OFF position.
- **AutoVerify™** is field-selectable using a jumper located on sensing element/ circuit board side of housing.
- When a fault is detected, both Red LEDs flash and the relays de-energize.

2.6.7 AutoVerify Criteria

1. AutoVerify feature must be enabled.
2. The sensor must generate an uncovered capacitance value greater than 2 pF. Typically, the active sensor length (active length = insertion length – cote shield length) must be greater than 8 inches (200 mm).
3. Consult Factory for specialty sensors that may be available for shorter length requirements.
4. Sensors that do not meet the above requirement can perform reliably for level measurement detection, and will pass AutoVerify / Manual Certify tests, but **will not** be able to detect a sensor that is, or has become, electrically disconnected from the transmitter.

2.7 Output and LED Status

There are three status LEDs located on the sensing element/circuit board side of the housing. One is used to indicate that the unit has power. The remaining two LEDs are used to indicate the condition of **RELAY #1** and **RELAY #2**. For an illustration, See Figure 2-5.

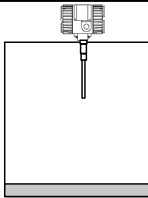


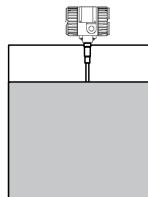


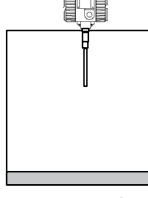

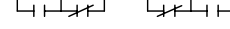
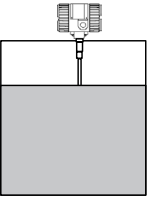


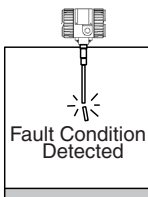

Tank Condition	Relay #2 = Alarm AutoVerify = disabled	Relay #2 = Fault AutoVerify = disabled																								
 High Level FailSafe Tank Empty	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 High Level FailSafe Tank Full	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED On	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 Low Level FailSafe Tank Empty	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED On	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 Low Level FailSafe Tank Full	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 Fault Condition Detected High Level FailSafe Tank Empty	<p>Relay and LED Output Status Relay #2 = Fault and AutoVerify = enabled</p> <table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table>  Power GREEN LED On Relay 1 RED LED Flashes Relay 2 RED LED Flashes		3	4	5	6	7	8	NO	C	NC	NO	C	NC												
3	4	5	6	7	8																					
NO	C	NC	NO	C	NC																					

Figure 2-5
Output and LED Status

2.8 Sensing Element Connection

Sensing element connects to the rear side of the circuit board and is factory-installed.



The sensing element is sealed to the housing and cannot be removed without permanent damage.

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing. See Figure 2-7. Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

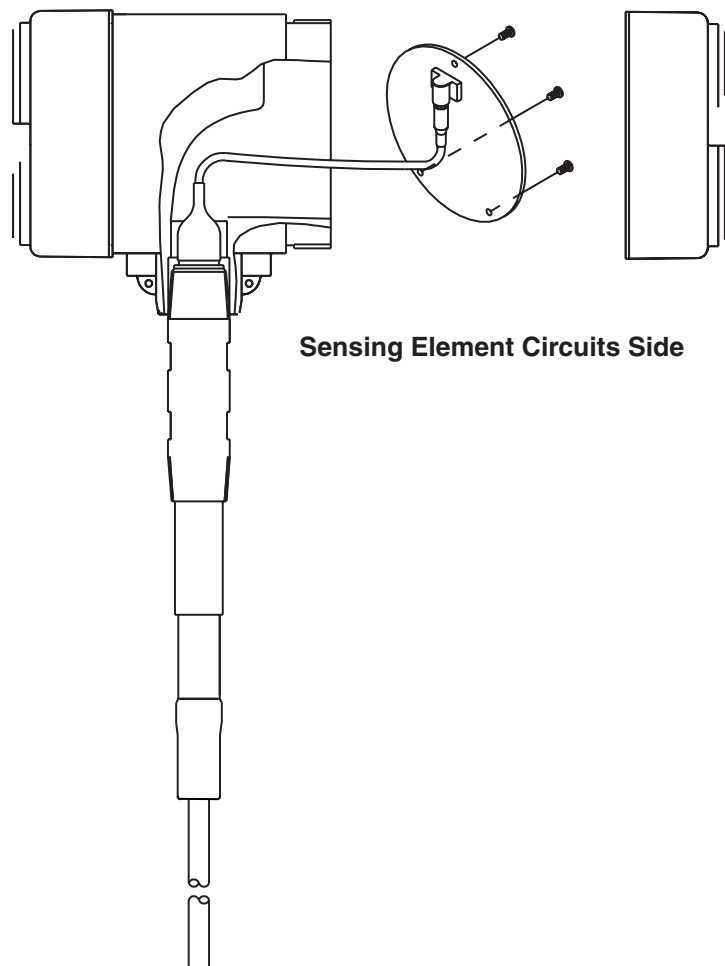


Figure 2-6
Sensing Element Connection
(Integral Housing)

2.8 Sensing Element Connection (continued)

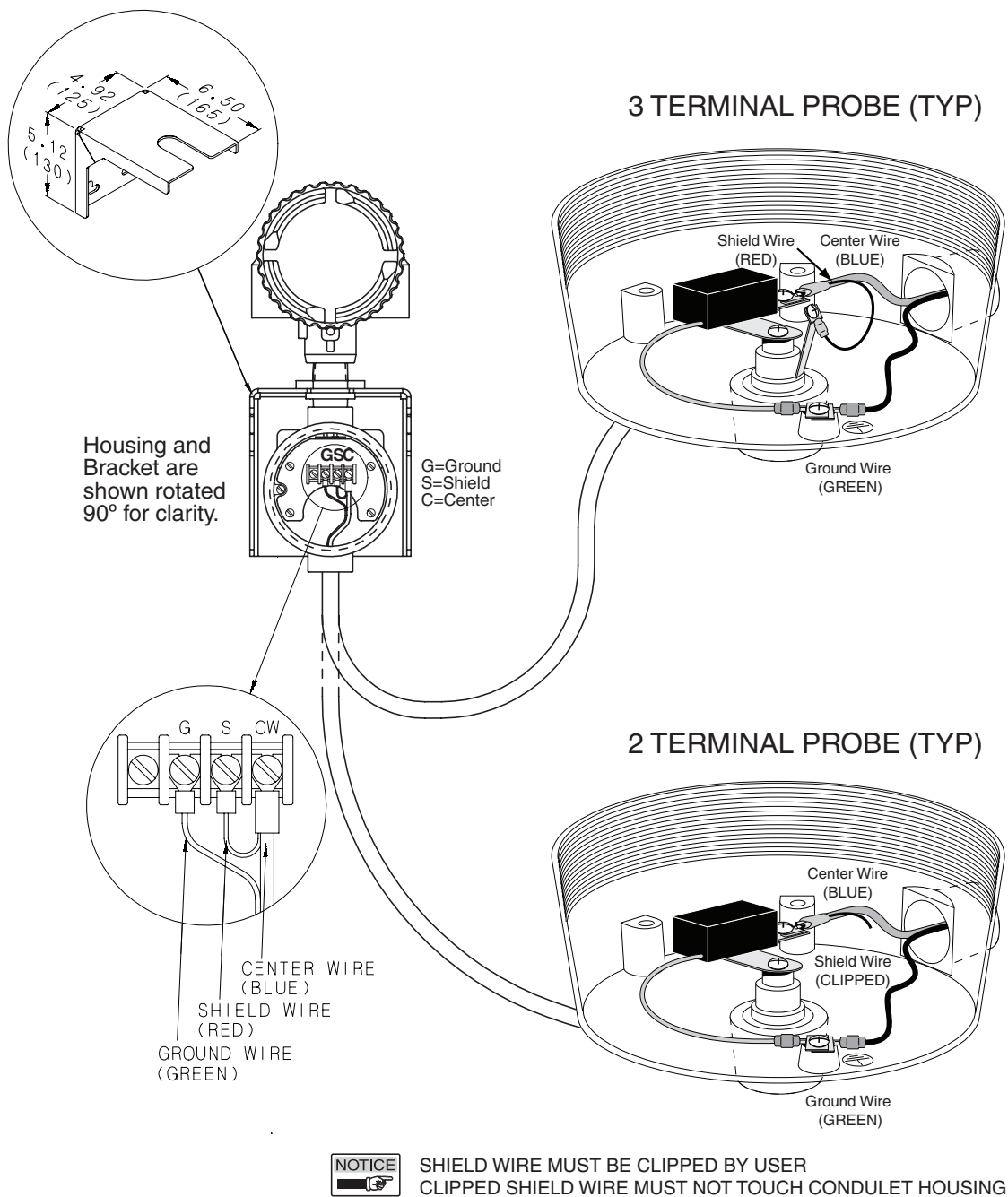


Figure 2-7
Sensing Element Connection
(Remote Housing)

Section 3: Calibration

3.1 Calibration

The IntelliPoint™ model RLL (Standard Sensitivity) and RPL (High Sensitivity) feature Auto-Cal calibration. Auto-Calibration is suitable for liquid and slurry applications. For applications such as granular materials, interface measurement of two liquids, and plugged chute installations, a Manual Calibration IntelliPoint is recommended.



If you purchased an "Auto-Calibration" IntelliPoint and have determined you require a "Manual Calibration" IntelliPoint based on the Application Guide, please contact our Service Dept. at 1-800-527-6297 or 215-674-1234.

3.1.2 Using The IntelliPoint with Auto-Calibration

After TheIntelliPoint is installed in the vessel, simply apply power. The electronic unit will auto calibrate.



Caution – The material being measured must be below the sensing element when power is applied (Sensing element uncovered).

Calibration is complete.

If power has been applied to The IntelliPoint prior to installation (on a test bench) or, if The IntelliPoint is moved from one vessel to another, **RECAL** is necessary for the unit to capture the new air value.

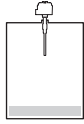
Merely press and hold the RECAL button (see Figure 2-4) for five (5) seconds. After five seconds, the Green and Red LED's flash for sixty seconds before reset occurs. [Remove power from The IntelliPoint while the LED's are flashing and reset will occur immediately].

The IntelliPoint is now ready for installation.



For sensing elements with active lengths over 6 feet (2 meters) a manual calibration mode (#8 standard sensitivity) is recommended.

3.2 Re Calibration



CAUTION:

The IntelliPoint RF instrument must be powered **AFTER** it is installed in application and with material **BELOW** sensing element.



Do NOT push the Recal button without first ensuring that the material being measured is below the sensing element.

If the system is powered on the bench prior to installation, or moved from one tank to another, RECAL is necessary to allow the software to capture the air capacitance generated by the sensing element in the tank.

Merely press and hold **RECAL** for 5 seconds (See Figure 2-8). The Green and Red LED's flash for 60 seconds before reset occurs. [Remove power from the system while the LED's are flashing and reset will occur immediately].

The system is now ready for installation.

Nonvolatile Memory

The IntelliPoint has nonvolatile memory which allows the unit to re-start after power outages without recalibrating.

When The IntelliPoint is powered for the first time the internal microprocessor records and stores the “Air” value. This is the uncovered value of the sensor mounted in the vessel. The IntelliPoint will also store the last covered value and the last uncovered value.

Whenever The IntelliPoint is powered it uses these values as a reference point to determine its current condition (normal or alarm).

The IntelliPoint has nonvolatile memory which retains the recorded values even if power is lost for months. When The IntelliPoint regains power after a power outage, the microprocessor compares the stored values to the current measured value. It will then determine its current status based on this.

Example for a 2 pF fixed preload:

Air value is 10pF
covered value is 20pF
Uncovered value is 10.2pF
Setpoint = 12pF

3.2 Recalibration (Continued)

For alarm this would be 2pF above Air (12pF in this case). For recovery this would be halfway between the Air and the SetPoint (11pF in this case). The setpoint is stored in memory to indicate the last status of the switch.

So, when the unit regains power the microprocessor reads the current value of the sensor and determines the status based on the stored values. It will only re-calibrate if the re-call button is pressed.

3.3 IntelliPoint Calibration Mode Change

The IntelliPoint was shipped in a calibration mode that was determined to meet the needs of the application for which it was originally sold. If, for some reason, the IntelliPoint is used on a different application, or for other reasons it is determined that a different calibration mode should be used, use the following procedure to make a calibration mode change.

Each IntelliPoint (except for manual calibration units) has 4 different Calibration Modes that are available, dependant on the model purchased.

3.3.1 Available IntelliPoint calibration modes:

Standard Sensitivity systems (RL, RN, RT, RV model series prefix):

Mode 1: Auto-Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint varies depending on material and coating deposit changes.

Mode 2: Fixed Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

Mode 3: Auto-Cal 10 pF.

This mode provides a 10 pF preload; alarm setpoint varies depending on material and coating deposit changes.

Mode 4: Fixed Cal 10 pF.

This mode provides a 10 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

High Sensitivity systems (RH, RP model series prefix):

Mode 1: Auto-Cal 0.5 pF.

This mode provides a 0.5 pF preload; alarm setpoint varies depending on material and coating deposit changes.

Mode 2: Fixed Cal 0.5 pF.

This mode provides a 0.5 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

Mode 3: Auto-Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint varies depending on material and coating deposit changes.

3.3.1 Available IntelliPoint calibration modes (Continued)

Mode 4: Fixed Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

Calibration Mode changes



Mode Selection change must be performed with the sensing element in air (Material below sensing element).

1. On the RF circuit board (Figure 3-1), temporarily remove the shunt jumper from the “Time Delay Selection Jumper” and place it on pins 1 & 2 of JP5. The green LED will go out, and the red LED’s will begin to flash. The number of flashes indicates which mode the unit is in: 1, 2, 3, or 4.
2. To switch modes, press and hold the ReCal button next to the JP5 3-pin connector. The unit will cycle through the modes.

First it will flash the current mode setting, then progress through all of the settings.

For Example:

The red LED will flash once indicating mode 1. Then it will flash twice-indicating mode 2. Then mode 3, etc.

Release the button when it reaches the desired mode. The red LED will now flash indicating which mode the unit is in.

3. Remove the shunt from pins 1 & 2 of JP5 and replace it on the “Time Delay Selection Jumper” pins from which it was removed. The unit will remain in the new selected calibration mode. Put the lid back on the housing securely.

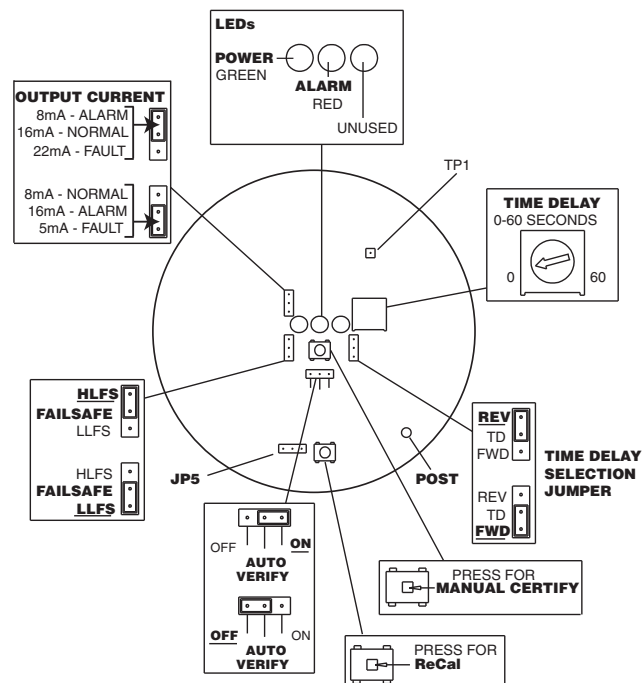
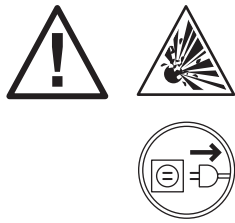


Figure 3-1
Circuit Board

Section 4: Troubleshooting

4.1 RF Point Level Troubleshooting Guide

Symptom	Possible Cause	Solution	See Section
Switch is in alarm and will not clear	Sensor is coated by a conductive material and the Cote-Shield™ element does not extend far enough into the vessel	Need a sensor with a longer Cote-Shield element. Rule of thumb is nozzle length + expected wall coating + 2 inches.	Section 2.2, 4.5
	Fail Safe switch is set to the wrong setting	Check to make sure the fail safe switch is in the correct position	Section 2.6.3
	Active section of sensor is touching an internal structure or material is bridging active to ground.	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A Section 2.2, 4.5
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 4.5, 4.6
	Flexible sensor is swaying and active is touching vessel or structure	Add 1 or 2 seconds of reverse acting time delay.	Section 2.6.1
Switch stays in alarm for extended period after level falls below sensor	Material bridging from active to tank structure	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A Section 2.2, 4.5
	Time delay may be active	Make sure time delay pot is full counterclockwise.	Section 2.5.1
Switch does not respond to material	There may not be enough active to "see" an insulating material	Try changing to high sensitivity or adding active length to sensor	Consult Factory Section 4.9
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 3.2
	Granular material – Active section is not getting enough coverage due to angle of repose	Relocate sensor to get more coverage or lengthen active. Changing to high sensitivity may also help.	Appendix A
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 4.6, 4.7
Switch delays in responding to material	Reverse acting time delay may be active	Check time delay settings to make sure they are correct	Section 2.6.1
LED's are Flashing	Flashing LED's indicate one of three things. Over Range / Under Range / fault	Consult instruction manual to determine which of the three symptoms are experienced.	Section 4.3, 4.4, 2.7
Over Range indicates that the standing capacitance of the sensing element in the vessel is too large to allow calibration	A long sensing element may generate too much standing capacitance to calibrate out	Padding is required –	Consult Factory Section 4.9
	The sensor could be touching an internal tank structure	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 3.2
	Improper wiring connection (Remote Switches)	Check remote cable connections to confirm they are correct.	Section 2.8
Under Range indicates that the electronic unit is not seeing enough capacitance.	Sensing Element is Disconnected	Verify sensing element cable connections. Test cable continuity.	Section 4.6, 4.7
	Unit is damaged	Consult factory	Section 4.9
Fault Indicates the Auto-Verify feature has detected a problem.	Sensing Element is Damaged	Check Sensing Element for Damage	Section 4.5
	Connecting Cable is Damaged	Check connection cable for damage, shorts, and proper termination	Section 4.6, 4.7
	Electronic Unit is damaged	Consult factory	Section 4.9
Green Power LED is out	Electronic unit is not getting power	Check power source to make sure proper power is supplied and connections are correct	Section 2.3
	Electronic Unit is damaged	Consult factory	Section 4.9



WARNING:

If the IntelliPoint instrument is located in a hazardous environment, do not open enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that wiring, electrical fittings and conduit connections conform to electrical codes for the specific location and hazard level.

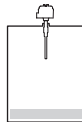
4.2 Testing Electronic Unit



This test is only a test of the electronic unit for troubleshooting purposes, and does not serve as a Verify or Certify test of the complete system.

Use the following steps to test the electronic unit:

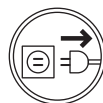
1. Be sure the environment is safe before removing the lid from the housing.



2. If possible to access the sensing element with the material below the sensor, or remove the IntelliPoint from the vessel, use your finger to touch TP1 (Shown in Figure 2-4) while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm state.

3. Again with no material touching the sensing element, touch the tip of the sensing element with your finger, while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm state.

4. If the IntelliPoint changes to the alarm state while touching test point TP 1, but not when touching the tip of the sensor, in most cases, the interconnecting cable is faulty. See Section 4.5: Testing Integral Cable, or Section 4.6 Testing Remote Cable.



5. If IntelliPoint is stuck in one state:

- A. Remove power.
- B. Disconnect coax cable that joins sensing element to electronic unit.
- C. Apply power.
- D. Repeat steps 3 and 4.
- E. If IntelliPoint changes state with sensing element disconnected, in most cases, sensing element is faulty.
See Section 4.5: Testing Sensing Element.



6. If there was no action in any of steps 2, 3, or 4 and unit appears dead:

- A. Remove and then reapply power.
- B. Press **ReCal** Button (*Shown in Figure 2-4*).
- C. Observe that green LED flashes for about 60 seconds.
- D. Green LED should be lit after 60 seconds.
- E. Touch test point (*Shown in Figure 2-4*) with your finger.
- F. Alarm & Relay should change state. If so, circuit board is working properly.
- G. Reinstall instrument and press **ReCal** Button.

7. If IntelliPoint fails all of above tests, in most cases instrument is faulty. Use a replacement Input/Output Module (**IOM**) or circuit board to determine fault. **Consult factory.**

4.3 Over Range

If Red LED is flashing quickly (4 times/second), IntelliPoint has detected that uncovered sensing element capacitance exceeds limits of transmitter. Consult factory for pad capacitor values and instructions.

4.4 Under Range

If Red LED is flashing slowly (once per second), IntelliPoint has detected that pad capacitor value is too large. Consult factory for pad capacitor values.

4.5 Testing The Sensing Element

Integral electronics, ref figure 4.1:

Remove Sensing Element Circuit Board and disconnect cable from circuit board

Remote electronics, ref figure 4.2

Disconnect remote cable at the sensing element.

1. With the sensing element in the vessel, verify level is below the sensing element
2. Use an analog ohmmeter¹ that is set to the R x 1K ohm scale. Measure the resistances between each pair of sensing element connections. See Figure 4.1 & 4.2. Record values in Table 4.1
 - a. If the process material is conductive, it is normal to measure some resistance between sensing element connections. The lowest permissible resistance values are:

Center Wire to Ground	1000 ohms.
Center Wire to Shield	600 ohms.
Cote Shield to Ground	300 ohms.
 - b. If all measurements are open circuit the sensing element has passed the test. If lower resistance was measured continue with testing.
3. Clean sensing element and repeat resistance measurements with the sensing element external to the vessel.
 - a. A clean sensing element should measure an open circuit on all resistance tests.
 - b. If resistance values increase to an open circuit the resistance was installation or coating related. The most common causes are:
 - i. Cote Shield element does not extend sufficiently into

4.5 Testing The Sensing Element (Continued)

- the vessel. Verify the CoteShield element extends at least 2" into the vessel and past wall build-up.
- ii. Extremely conductive coating on the sensing element. This may require changing the sensing element or electronics. Contact the factory for recommendations.
 - iii. Sensing element is touching vessel. A resistance reading of less than 10 ohms to ground (sensing element housing or tank) is usually due to a metal-to-metal short circuit. Verify that the sensing element is not touching any vessel structure.
 - c. If the sensing element still shows resistance between terminals of less than 10K ohms, it is possible that moisture is present internal to the sensing element. It may be possible to dry the sensing element until the resistance increases to a value in excess of 10K ohms. However this is an indication the integrity of the sensing element has been compromised. Contact the factory for recommendations.

¹ A digital ohmmeter will often produce a resistance measurement that is higher than the actual value.

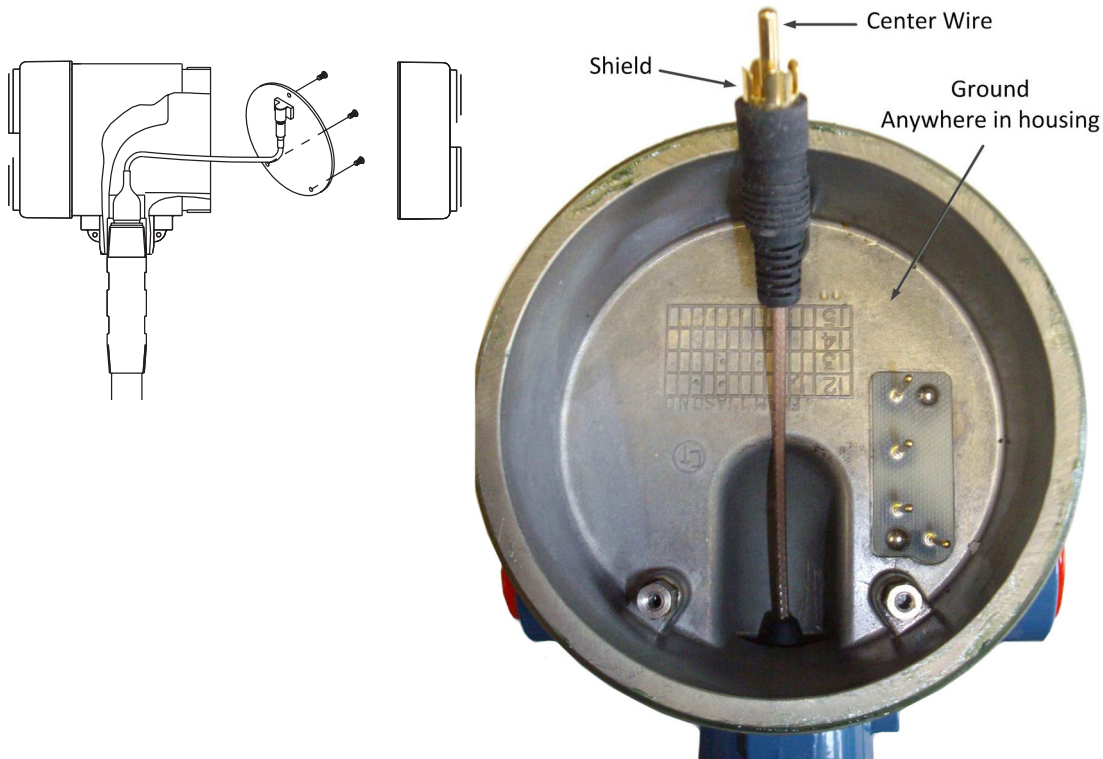


Figure 4-1
Checking the Sensing Element

4.5 Testing The Sensing Element (Continued)

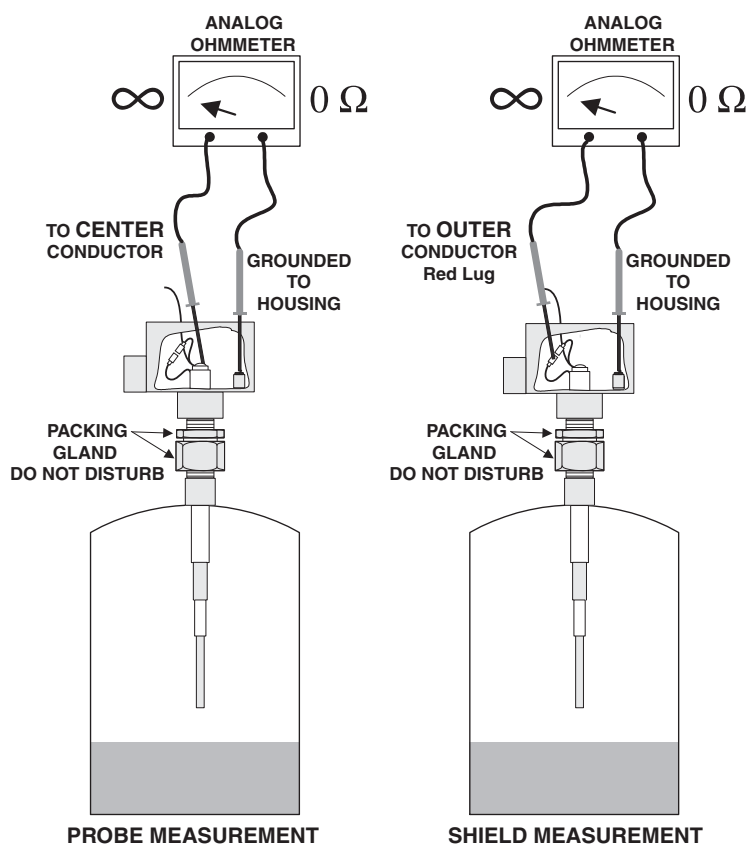


Figure 4-2
Checking the Sensing Element
Center = Probe
Outer = Shield
Housing = Ground

Sensing Element in Vessel

Center Conductor to Housing	_____	Ohms
Center Conductor to Cote Shield	_____	Ohms
Cote Shield to Housing	_____	Ohms

Sensing Element Cleaned

Center Conductor to Housing	_____	Ohms
Center Conductor to Cote Shield	_____	Ohms
Cote Shield to Housing	_____	Ohms

Table 4-1

4.6 Testing the Integral Cable

1. Disconnect integral cable from electronic.
2. Check for continuity.
 - a. Using an ohmmeter measure the resistances.
 - i. From the center wire connection on the RCA plug to the sensing element active section (center wire)
 - ii. From the shield connection on the RCA plug to the sensing element shield.
 - iii. If resistance is greater than 5Ω the cable has failed.
3. Check for shorts.
 - a. The integral cable is tested as part of sensing element test, section 4.5.

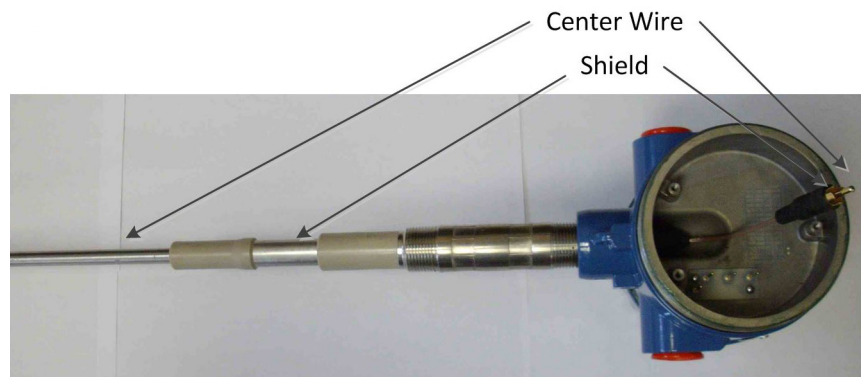


Figure 4-3
Testing Integral Cable

4.7 Testing the Remote Cable

1. Disconnect remote cable from electronic unit and sensing element.
2. Using an ohmmeter measure the resistances as shown in Figure 4.4
 - a. Check for shorts.
 - i. Connect ohmmeter to cable center wire and ground wire. Measure resistance as shown.
 - ii. Move ohmmeter leads and repeat for all measurements shown.
 - iii. If resistance is less than 100 k-ohms cable has failed
 - b. Check for continuity.
 - i. Short center wire to ground wire and measure resistance as shown. Should be close to 0 ohms
 - ii. Short center wire to shield and repeat.
 - iii. If resistance is greater than 10 ohms cable has failed

4.7 Testing the Remote Cable (Continued)

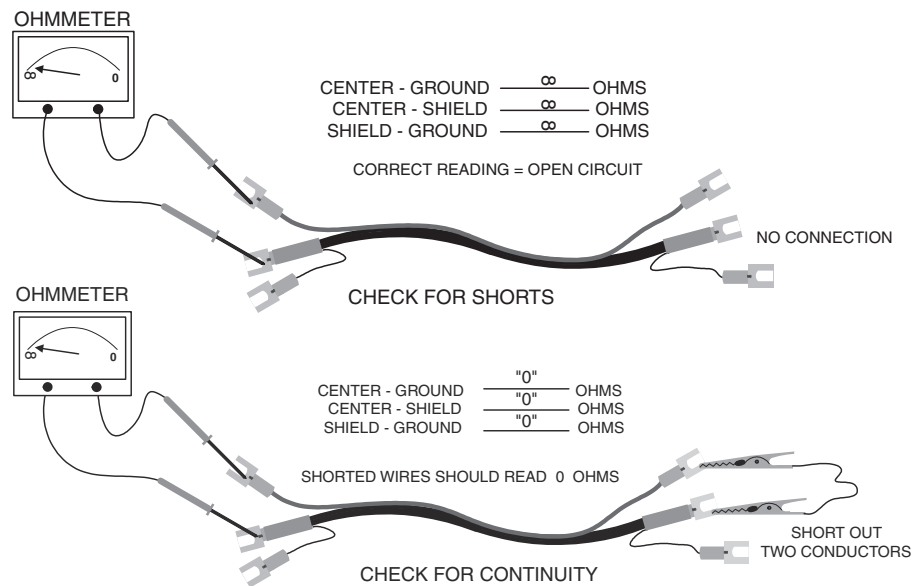
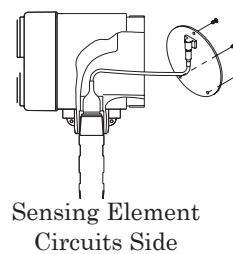


Figure 4-4
Testing Remote Cable

4.8 Testing the Power Supply

Power supply can be tested separately as follows:

1. Remove power from electronic unit.
2. Remove three screws holding circuit board into housing.
3. Disconnect sensing element connection. **See to Section 2.8 Sensing Element Connection.**
4. Reapply power.
5. Using a DC voltmeter, measure voltage from -5 to Common and +5 to Common. Correct readings are -5 to -6 and +5 to +6 Vdc. **See Figure 4-4**



Power Supply Voltages

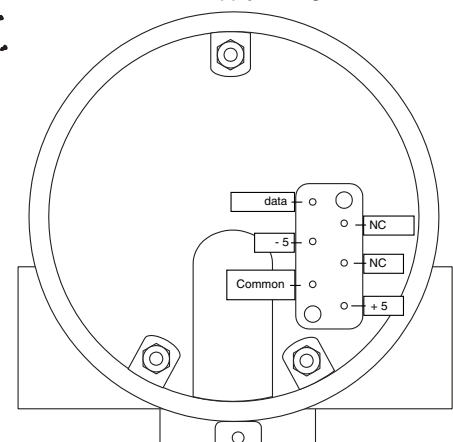


Figure 4-4
Testing Power Supply

4.9 Factory Assistance

AMETEK Drexelbrook can answer any questions about your level measurement system. Call Customer Service at 1-800-553-9092 (US and Canada) , or + 215-674-1234 (International).

If you require assistance and attempts to locate the problem have failed:

- **Contact** your local Drexelbrook representative,
- **Call** the Service department toll-free at 1-800-527-6297 (US and Canada) or + 215-674-1234 (International),
- **FAX** the Service department at + 215-443-5117, or
- **E-Mail** to drexelbrook.service@ametek.com

Please provide the following information:

Instrument Model Number _____

Sensing Element Model Number and Length _____

Original Purchase Order Number _____

Material being measured _____

Temperature _____

Pressure _____

Agitation _____

Brief description of the problem _____

Checkout procedures that have failed _____

4.10 Field Service

Trained field servicemen are available on a time-plus-expense basis to assist in start-ups, diagnosing difficult application problems, or in-plant training of personnel. Contact the service department for further details.

4.11 Customer Training

Periodically, AMETEK Drexelbrook instrument training seminars for customers are held at the factory. These sessions are guided by Drexelbrook engineers and specialists, and provide detailed information on all aspects of level measurement, including theory and practice of instrument operation. For more information about these valuable workshops, write to AMETEK Drexelbrook, attention: Communications/ Training Group, or call direct + 215-674-1234.

4.12 Equipment Return

In order to provide the best service, any equipment being returned for repair or credit must be pre-approved by the factory.

In many applications, sensing elements are exposed to hazardous materials.

- **OSHA mandates** that our employees be informed and protected from hazardous chemicals.
- **Material Safety Data Sheets (MSDS)** listing the hazardous materials to which the sensing element has been exposed **MUST** accompany any repair.
- It is your responsibility to fully disclose all chemicals and decontaminate the sensing element.

To obtain a return authorization (RA#), contact the Service department at 1-800-527-6297 (US and Canada) or + 215-674-1234 (International).

Please provide the following information:

Model Number of Return Equipment _____

Serial Number _____

Original Purchase Order Number _____

Process materials to which equipment has been exposed

MSDS sheets for any hazardous materials

Billing Address _____

Shipping Address _____

Purchase Order Number for Repairs _____

Please include a purchase order even if the repair is under warranty. If repair is covered under warranty, you will not be charged.

Ship equipment freight prepaid to:
AMETEK-DREXELBROOK.
205 KEITH VALLEY ROAD
HORSHAM, PA 19044-1499
COD shipments will not be accepted.

Section 5

Section 5: Specifications

5.1 Specifications

Technology:	RF/ Capacitance
Calibration:	None
Modes of Operation:	High and Low Level
Repeatability:	2mm (0.08 inch) Conductive Liquids
Response Time:	Less than 1 Second
Time Delay:	0 to 60 Seconds Forward & Reverse Acting
Ambient Electronics:	-30 to 70°C (-22 to 158°F) ATEX -40 to 70°C (-40 to 158°F) FM
Storage Temperature:	-40 to 85°C (-40 to 185°F)
Indicators:	LEDs: Green=Power, Red= Relay 1, Red= Relay 2
Self-Check:	Continuous AutoVerify and Manual Certify
Power Supply:	Universal Supply 85 to 250 VAC 21 to 100 VDC Auto-Detecting w/o Jumper Changes DC to 400 Hz
Power Consumption:	2 Watts Maximum
Relay Contacts:	(2) SPDT
Maximum Contact Load:	5A/30 VDC/ 5A/250 VAC - Environmentally Sealed
Maximum Switching Capacity:	2000 VA/150 Watt
Minimum Contact Load (DC):	100 mA/12 VDC 0 to 200 mA / 12 VDC Optional
Housing (Electronics):	Dual Compartment, Powder-Coated Aluminum with Two Cable Entries
Cable Entry:	M20 x 1.5 ATEX/ ¾-Inch NPT FM/FMc
Ingress Protection:	IP66 NEMA 4X

5.2 Approvals Available:

ATEX

Integral



II 2 (1) G Ex d [ia] IIC T5... T2
II 2 (1) D Ex tb [ia] IIIC T90°C
FM14ATEX0049



Temperature Class Process Temperature

T5	100°C
T4	135°C
T3	200°C
T2	230°C

Remote



II 2 (1) G Ex d [ia] IIC T5... T2
II 2 (1) D Ex tb [ia] IIIC T90°C
FM14ATEX0049



Special Condition for Safe Use

The partially insulated sensing element shall be installed and used in such a way that the danger of electrostatic charge is excluded

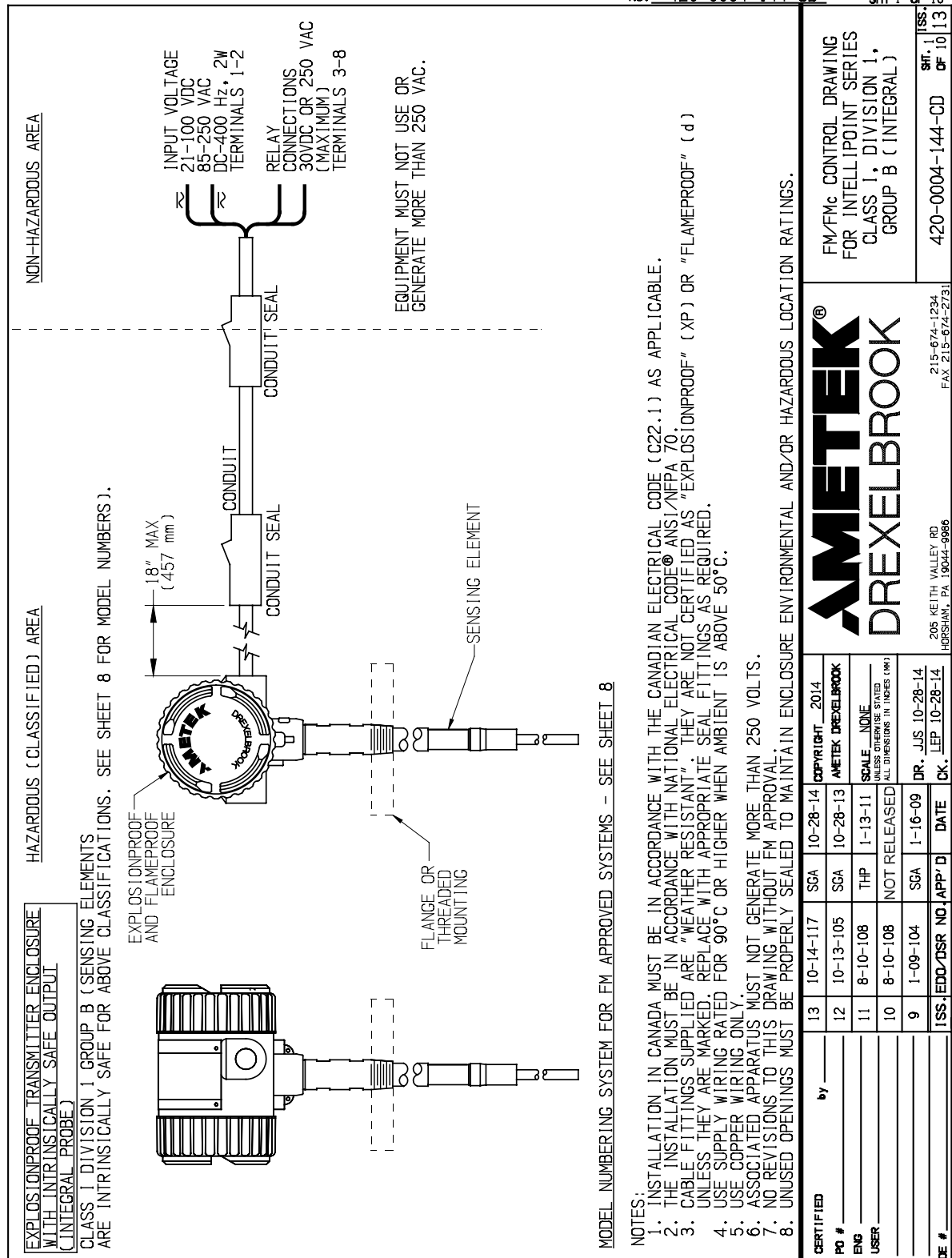
FM / FMc



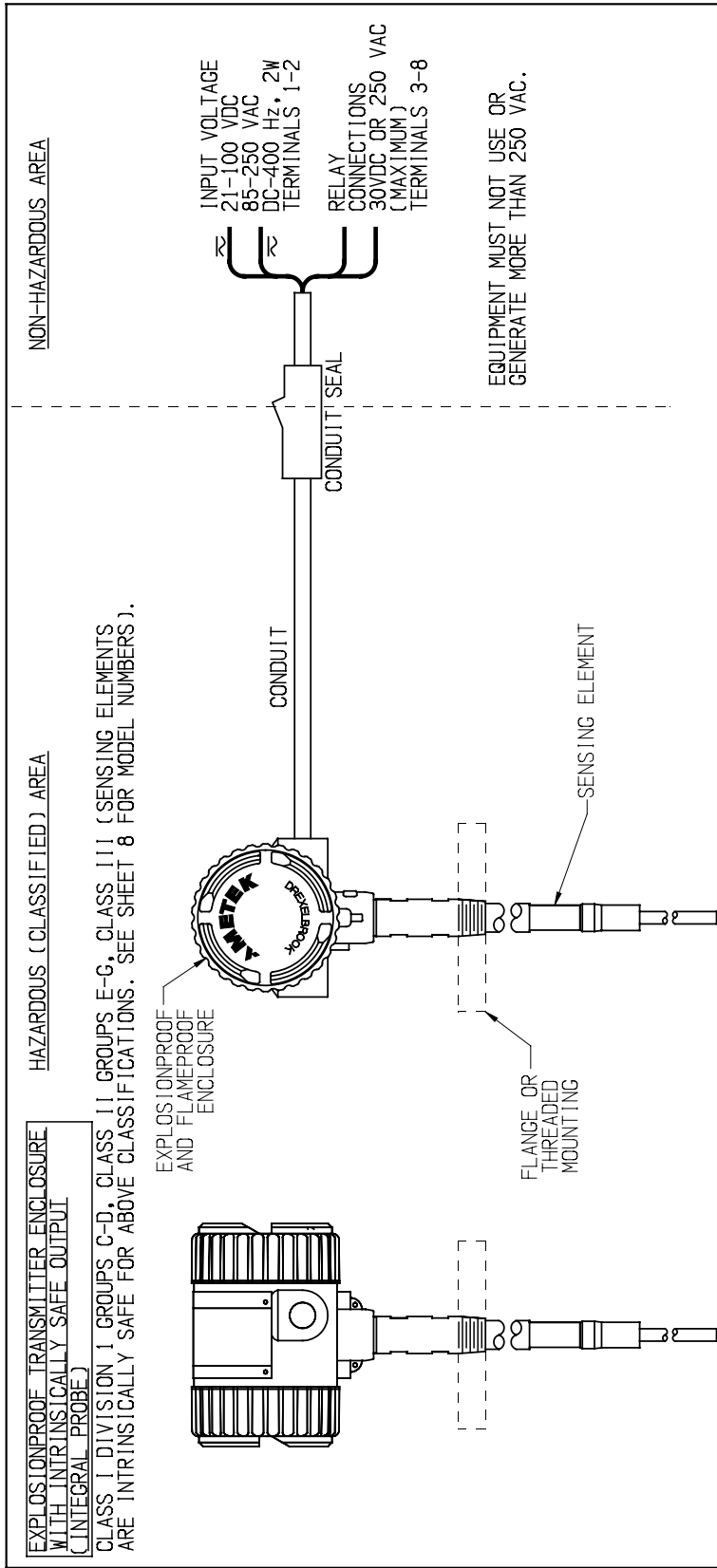
Explosionproof for Class I, Division 1, Groups A, B, C and D;
Dust-Ignition proof for Class II, III, Division 1, Groups E, F and G; Non-incendiary for Class I, Division 2, Groups A, B, C & D; Suitable for Class II, III, Division 2, Groups F & G hazardous outdoor Type 4, 4X, IP66 (classified) locations with Intrinsically Safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F and G hazardous (classified) locations in accordance with Control Drawing 420-0004-144-CD.

Section 6 : Control Drawings / Certificates

6.1 FM / FMc Control Drawings



6.1 FM / FMc Control Drawings (Continued)



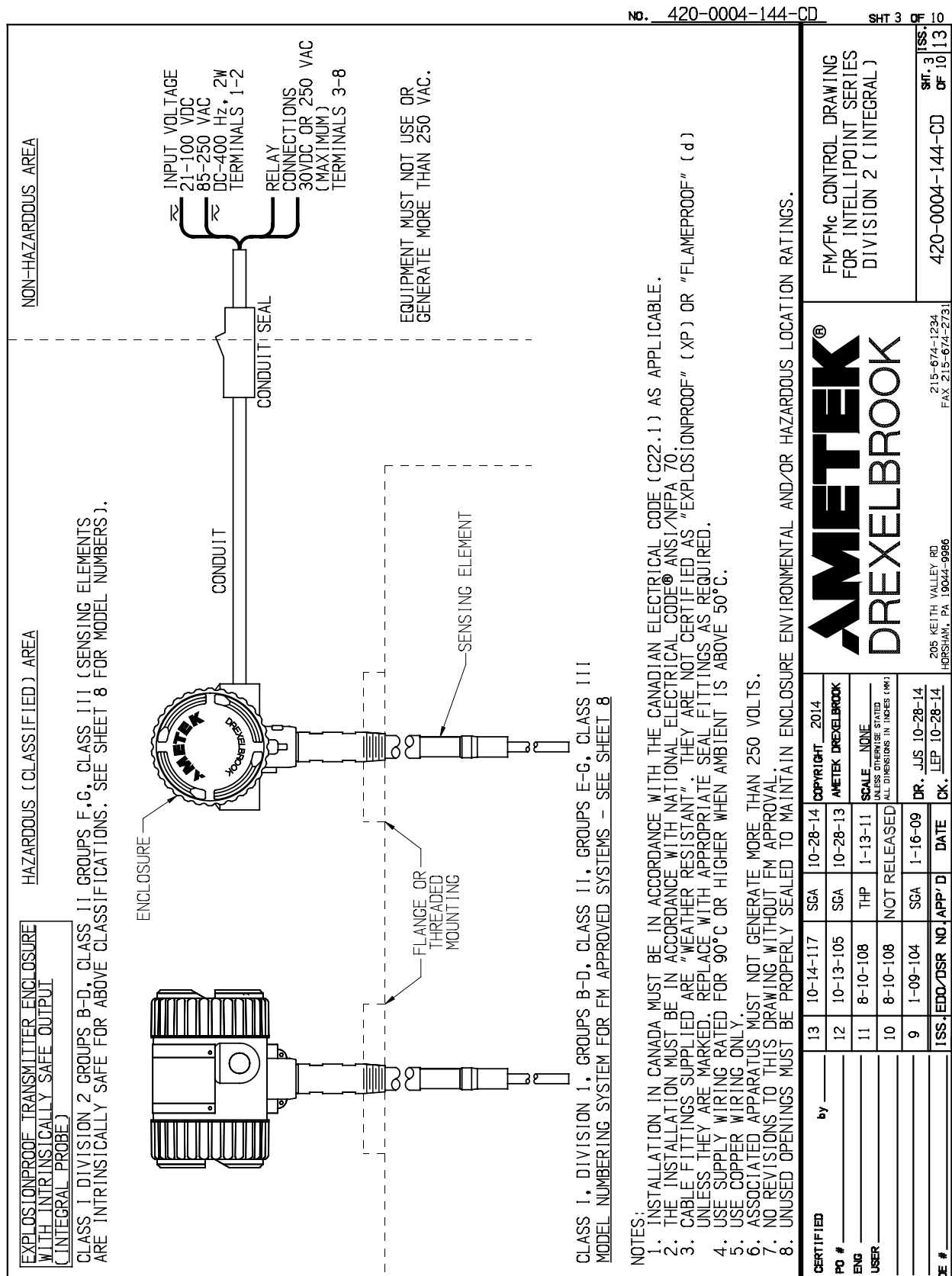
MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8

NOTES:

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (ANSI/NFPA 70).
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED		by		13	10-14-117	SCA	10-28-14	COPYRIGHT	2014	FM/FMc CONTROL DRAWING FOR INTELLIPOINT SERIES CLASS I, II, III, DIVISION 1, GROUPS C-G (INTEGRAL)	
PO #	12	10-13-105	SCA	10-28-13	AMETEK DREXELBROOK		SHT. 2 OF 10				
ENG	11	8-10-108	THP	1-13-11	SCALE NONE		ISS.				
USER	10	8-10-108	NOT RELEASED	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)		OF 10					
DE #	9	1-09-104	SCA	1-16-09	DR. JUS 10-28-14	215-674-1234 FAX 215-674-2731					
ISS.		EDO/DSR	NO.	APP'D	DATE	DR. JUS 10-28-14		205 KEITH VALLEY RD HORSHAM, PA 19044-9986			
LEP		10-28-14		CK.		10-28-14		420-0004-144-CD			

6.1 FM / FMc Control Drawings (Continued)



6.1 FM / FMc Control Drawings (Continued)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE
WITH INTRINSICALLY SAFE OUTPUT
(REMOTE PROBE)

CLASS 1 DIVISION 1 GROUP A (SENSING ELEMENTS
ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.
SEE SHEET 9 FOR MODEL NUMBERS).

PROBE ENCLOSURE
285-0001-062
285-0001-063
285-0001-064
285-0001-065
285-0001-067

FITTINGS
(WEATHER
RESISTANT)

SENSING ELEMENT
CONNECTIONS
(INTRINSICALLY SAFE)

EXPLOSIONPROOF
AND FLAMEPROOF
ENCLOSURE

380 SERIES CABLE
150 FT. (46 METERS) MAX.
NOTE: INTRINSICALLY SAFE

SENSING ELEMENT

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

EQUIPMENT MUST NOT USE OR
GENERATE MORE THAN 250 VAC.

INPUT VOLTAGE
21-100 VDC
85-250 VAC
DC-400 Hz, 2W
TERMINALS 1-2

RELAY
CONNECTIONS
30VDC OR 250 VAC
(MAXIMUM)
TERMINALS 3-8

CONDUIT SEAL

CONDUIT

CONDUIT SEAL

2" MAX
(50 mm)

AMETEK
DREXELBROOK

MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 9

NOTES:
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d).
UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED by

PO #

ENG

USER

DE #

13

12

11

10

9

10-14-117

10-13-105

8-10-108

8-10-108

1-09-104

SGA

SGA

THP

NOT RELEASED

SGA

10-28-14

10-28-13

1-13-11

NOT RELEASED

1-16-09

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AMETEK DREXELBROOK

SCALE NONE

UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)

DR. JUS 10-28-14

LEP 10-28-14

DATE

OK

ISS/EDD/DSR NO. APP'D

DATE

OK

ISS: 4

SHT. 4

OF 10

13

FM/FMc CONTROL DRAWING
FOR INTELLIPOINT SERIES
CLASS 1, DIVISION 1
GROUP A (REMOTE)

420-0004-144-CD

215-674-1234
FAX 215-674-2731

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

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6.1 FM / FMc Control Drawings (Continued)

PROBE ENCLOSURE
285-0001-062
285-0001-063
285-0001-064
285-0001-065
285-0001-067

FITTINGS
(WEATHER
RESISTANT)

CW

SH

GND

SENSING ELEMENT
CONNECTIONS
(INTRINSICALLY SAFE)

EXPLOSIONPROOF
AND FLAMEPROOF
ENCLOSURE

380 SERIES CABLE
150 FT. (46 METERS) MAX.
NOTE: INTRINSICALLY SAFE

18" MAX
(457 mm)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE
WITH INTRINSICALLY SAFE OUTPUT
(REMOTE PROBE)

CLASS 1 DIVISION 1 GROUP B (SENSING ELEMENTS
ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.
SEE SHEET 9 FOR MODEL NUMBERS).

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

EQUIPMENT MUST NOT USE OR
GENERATE MORE THAN 250 VAC.

INPUT VOLTAGE
21-100 VDC
85-250 VAC
DC-400 Hz, 2W
TERMINALS 1-2

RELAY
CONNECTIONS
30VDC OR 250 VAC
(MAXIMUM)
TERMINALS 3-8

CONDUIT SEAL

CONDUIT

CONDUIT SEAL

CONDUIT

MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 9

NOTES:
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d)
UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED by

PO #

ENG

USER

DE #

13 10-14-117 SGA 10-28-14 COPYRIGHT 2014

12 10-13-105 SGA 10-28-13 AMETEK DREXELBROOK

11 8-10-108 THP 1-13-11 SCALE NONE

10 8-10-108 NOT RELEASED ALL DIMENSIONS IN INCHES (MM)

9 1-09-104 SGA 1-16-09 DR. JUS 10-28-14

ISS EDD/DSR NO. APP'D DATE CK. LEP 10-28-14

FM/FMc CONTROL DRAWING
FOR INTELLIPOINT SERIES
CLASS 1, DIVISION 1
GROUP B (REMOTE)

420-0004-144-CD

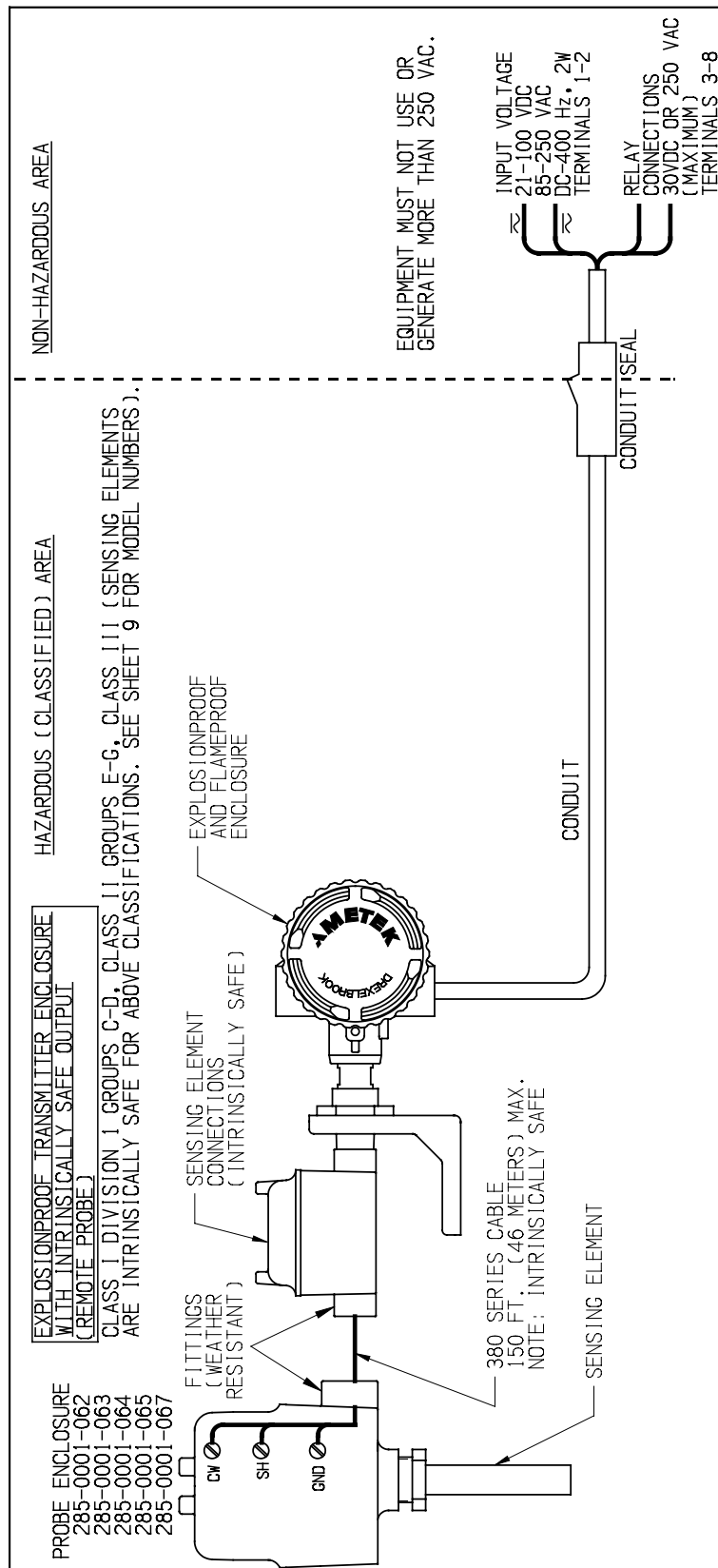
ISS. SFT. 5 OF 10

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2731

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6.1 FM / FMc Control Drawings (Continued)



MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 9

NOTES:

- NOTES:
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
 7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

[illegible]

6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-144-CD SHT 7 OF 10

EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (REMOTE PROBE)

CLASS 1, DIVISION 2 GROUPS A-D, CLASS II, GROUPS F, G, CLASS III (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEET 9 FOR MODEL NUMBERS).

EXPLOSIONPROOF AND FLAMEPROOF ENCLOSURE

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

PROBE ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (REMOTE PROBE)

285-0001-062

285-0001-063

285-0001-064

285-0001-065

285-0001-067

FITTINGS (WEATHER RESISTANT)

SENSING ELEMENT CONNECTIONS (INTRINSICALLY SAFE)

380 SERIES CABLE 150 FT. (46 METERS) MAX. NOTE: INTRINSICALLY SAFE

SENSING ELEMENT

EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (REMOTE PROBE)

CONDUIT

CONDUIT, SEAL

INPUT VOLTAGE 21-200 VDC 85-250 VAC DC-400 Hz, 2W TERMINALS 1-2

RELAY CONNECTIONS 30VDC OR 250 VAC (MAXIMUM) TERMINALS 3-8

EQUIPMENT MUST NOT USE OR GENERATE MORE THAN 250 VAC.

CLASS 1, DIVISION 1, GROUPS A-D, CLASS II, GROUPS E-G, CLASS III MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 9

NOTES:

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.

2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.

3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.

4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.

5. USE COPPER WIRING ONLY.

6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.

7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.

8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

AMETEK® DREXELBROOK

205 KEITH VALLEY RD. HOBBSIAN, PA 19044-9986

215-674-1234 FAX 215-674-2731

FM/FMc CONTROL DRAWING FOR INTELLIPoint SERIES DIVISION 2 (REMOTE)

420-0004-144-CD SHT. 7 OF 10

CERTIFIED	by	13	10-14-117	SGA	10-28-14	COPYRIGHT	2014
PO #		12	10-13-105	SGA	10-28-13	AMETEK DREXELBROOK	
ENG		11	8-10-108	THP	1-13-11	SCALE NONE	
USER		10	8-10-108	NOT RELEASED		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)	
ISS.	EDD/DSR	9	1-09-104	SGA	1-16-09	DR. JJS 10-28-14	
DE #		CK.	LEP 10-28-14				

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6.1 FM / FMc Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY											
1	2	3	4	5	6	7	8	9	10	11	12
R	a	L	b	0	c	d	e	*	*	*	f
	a										a = OPTIONS
											N = NO-CAL (STD)
											M = MANUAL SET POINT ADJUSTMENT
											H = HI SENSITIVITY
											G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT
											L = STANDARD AUTO CAL
											T = 10pF AUTO CAL
											V = 10pF FIXED
											P = HI SENSITIVITY .5pF FIXED
			b								b = OPTIONS
											3 = (STD)
											7 = DUAL SEAL
											B = DUAL SEAL
					c						c = RELAYS
											1 = STANDARD RELAY
											2 = GOLD CONTACTS
											d = 0, 1 OR Z SENSING ELEMENTS
											e = 0-4, 6-9, Z SENSING ELEMENTS
											SENSING ELEMENTS
				0	0						700-1202-021
					1						700-1202-022
					2						700-1202-024
					3						700-1202-028
					4						700-1202-042
					6						700-1202-032
					7						700-1202-020
					9						700-1202-034
				1	1						700-0201-005
					2						700-0201-005 HAST C
					3						700-0201-036
					6						700-0002-360
					7						700-0202-036
					8						700-0001-022
					9						700-0002-023
				N	N						RETROFIT KIT 285-0001-671
				Z	Z						SEE SHEET 10 FOR A LIST OF OTHER APPROVED SENSING ELEMENTS
											f
											f = A-F, G, H, J, K, L OR Z
											INSERTION LENGTH/COTE SHIELD LENGTH
										A	6"/2" & 152.4mm/50.8mm
										B	12"/2" & 304.8mm/50.8mm
										C	12"/3.5" & 304.8mm/88.9mm
										D	18"/2" & 457.2mm/50.8mm
										E	18"/3.5" & 457.2mm/88.9mm
										F	18"/10" & 457.2mm/254mm
										G	18"/NO CSL & 457.2mm/NO CSL
										H	36"/10" & 914.4mm/254mm
										J	36"/NO CSL & 914.4mm/NO CSL
										K	48"/10" & 1219.2mm/254mm
										L	60"/10" & 1524mm/254mm
										Z	OTHER
										1	18"/6" & 457.2mm/152.4mm
										2	12"/6" & 304.8mm/152.4mm

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 AMETEK DREXELBROOK
 SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 10-28-14
 CK. LEP 10-28-14

CERTIFIED by _____
 PO # _____
 ENG _____
 USER _____
 DE # _____

13	10-14-117	SGA	10-28-14		FM/FMc APPROVED INTEGRAL INTELLIPOINT MODEL NUMBERING SYSTEM
12	10-13-105	SGA	10-28-13		
11	8-10-108	THP	1-13-11		
10	8-10-108	NOT RELEASED			
ISS.	EDO/DSR NO.	APP'D	DATE	205 KEITH VALLEY RD HORSHAM, PA 19044-9986 215-674-1234 FAX 215-674-2731	420-0004-144-CD SHT. 8 OF 10 ISS. 13

6.1 FM / FMc Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY											
1	2	3	4	5	6	7	8	9	10	11	12
R	a	L	b	c	d	e	f	*	*	*	g
								a = OPTIONS			
								N = NO-CAL (STD)			
								L = STANDARD AUTO CAL			
								M = MANUAL SET POINT ADJUSTMENT			
								T = 10pf AUTO CAL			
								H = HI SENSITIVITY			
								V = 10pf FIXED			
								G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT			
								P = HI SENSITIVITY .5pf FIXED			
								b = OPTIONS			
								3 = (STD)			
								7 = DUAL SEAL			
								B = DUAL SEAL			
								c = 1-9, A-K CABLE LENGTHS			
								d = RELAYS			
								1 = STANDARD RELAYS			
								2 = GOLD CONTACTS			
								e = 0-3, 5, 6, N, OR Z SENSING ELEMENTS			
								f = 0-9, N, OR Z SENSING ELEMENTS			
								SENSING ELEMENTS			
								0 0 700-1202-001			
								1 700-1202-012			
								2 700-1202-014			
								3 700-1202-018			
								4 700-1202-041			
								6 700-1202-031			
								7 700-1202-010			
								9 700-1202-033			
								1 0 700-0001-018			
								1 700-0201-005			
								2 700-0201-005 HAST C			
								3 700-0201-036			
								4 700-0202-002			
								5 700-0202-043			
								6 700-0002-360			
								7 700-0202-036			
								8 700-0001-022			
								9 700-0202-023			
								2 0 700-0209-002			
								3 1 700-0029-001			
								2 700-0029-002			
								3 700-0029-003			
								4 700-0029-004			
								5 700-0029-005			
								5 0 700-0207-001			
								1 700-0207-002			
								2 700-0207-003			
								3 700-0207-004			
								4 700-0207-005			
								5 700-0207-006			
								6 0 700-0204-038			
								1 700-0204-002			
								2 700-0204-048			
								N N RETROFIT KIT 285-0001-671			
								Z Z SEE SHEET 10 FOR ADDITIONAL APPROVED SENSING ELEMENTS			
								g = A-F, G, H, J, K, L OR Z			
								INSERTION LENGTH/COTE SHIELD LENGTH			
								A 6"/2" & 152.4mm/50.8mm			
								B 12"/2" & 304.8mm/50.8mm			
								C 12"/3.5" & 304.8mm/88.9mm			
								D 18"/2" & 457.2mm/50.8mm			
								E 18"/3.5" & 457.2mm/88.9mm			
								F 18"/10" & 457.2mm/254mm			
								G 18"/NO CSL & 457.2mm/NO CSL			
								H 36"/10" & 914.4mm/254mm			
								J 36"/NO CSL & 914.4mm/NO CSL			
								K 48"/10" & 1219.2mm/254mm			
								L 60"/10" & 1524mm/254mm			
								Z OTHER			
								1 18"/6" & 457.2mm/152.4mm			
								2 12"/6" & 304.8mm/152.4mm			

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 AMETEK DREXELBROOK
 SCALE NONE
 UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 10-28-14
 CK. LEP 10-28-14

CERTIFIED by _____
 PO # _____
 ENG _____
 USER _____
 DE # _____

13	10-14-117	SGA	10-28-14
12	10-13-105	SGA	10-28-13
11	8-10-108	THP	1-13-11
10	8-10-108	NOT RELEASED	
ISS.	EDD/DSR NO.	APP'D	DATE

205 KEITH VALLEY RD. 215-674-1234
 HORSHAM, PA 19044-9986 FAX 215-674-2731

FM/FMc APPROVED REMOTE INTELLIPOINT MODEL NUMBERING SYSTEM
 420-0004-144-CD
 SHT. 9 OF 10
 ISS. 13

6.1 FM / FMc Control Drawings (Continued)

MODEL NUMBERS OF APPROVED SENSING ELEMENTS

70l-mnop-qrst LEVEL PROBE

- l = FAMILY NO. 0, 4
 m = FAMILY NO. 0 THROUGH 9, BLANK
 n = FAMILY NO. 0 THROUGH 9, BLANK
 o = 0 THROUGH 9, BLANK
 p = 0 THROUGH 9
 q = FAMILY NO. 0 THROUGH 9, BLANK
 r = FAMILY NO. 0 THROUGH 9, BLANK
 s = FAMILY NO. 0 THROUGH 9
 t = 24 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

NOTES:

1. MAXIMUM PROCESS TEMPERATURE 290°C.
2. MAXIMUM SENSOR CAPACITANCE < 1 μ F.
3. MAXIMUM INSERTION LENGTH *RIGID SENSOR* 30 FEET (9.144 METERS).
4. MAXIMUM INSERTION LENGTH *FLEXIBLE SENSOR* 2000 FEET (609.6 METERS).
5. SENSING ELEMENT ENCLOSURE IP66 (IP RATING DOES NOT APPLY TO SPECIAL SENSORS SUPPLIED WITHOUT A 285- SERIES SENSING ELEMENT ENCLOSURE).

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SCALE	NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	
DR.	JJS 10-28-14
CK.	LEP 10-28-14

NO. 420-0004-144-CD

CERTIFIED	by _____
PO #	_____
ENG	_____
USER	_____
DE #	_____

SHT 10 OF 10

13	10-14-117	SGA	10-28-14
12	10-13-105	SGA	10-28-13
11	8-10-108	THP	1-13-11
10	8-10-108	NOT RELEASED	
ISS.	EDD/DSR NO.	APP'D	DATE

AMETEK®
DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

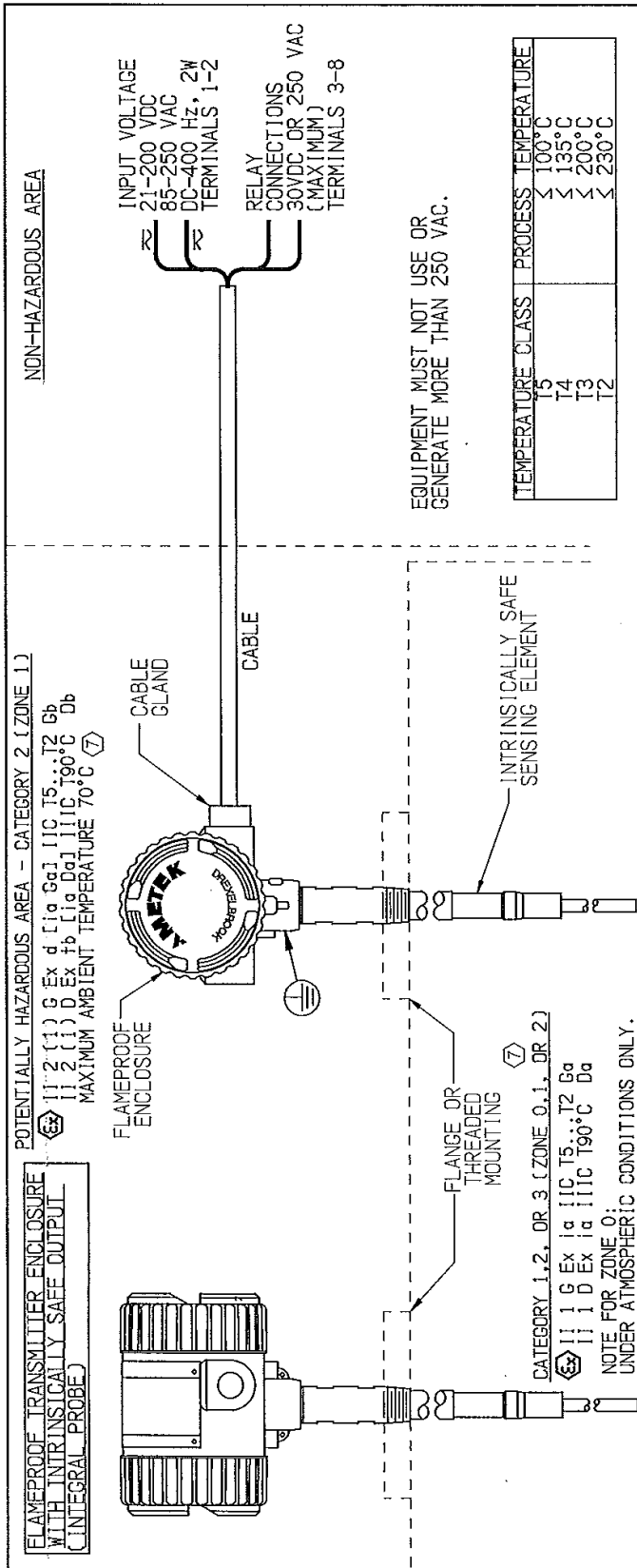
215-674-1234
FAX 215-674-2731

FM/FMc APPROVED
ADDITIONAL
SENSING ELEMENTS

420-0004-144-CD

SHT. 10 OF 10
ISS. 13

6.2 ATEX Control Drawings

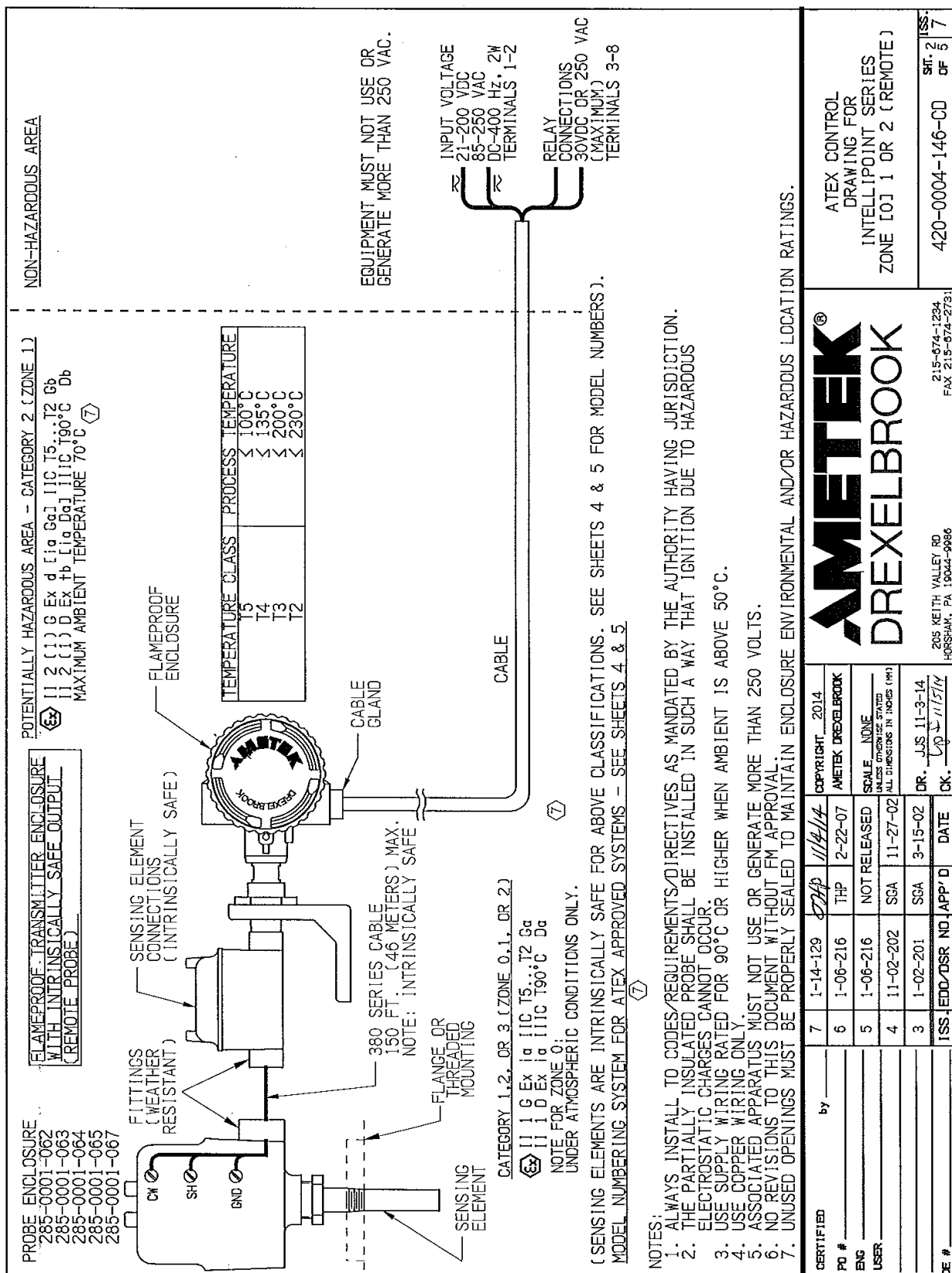


(SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEET 3 FOR MODEL NUMBERS).
MODEL NUMBERING SYSTEM FOR ATEX APPROVED SYSTEMS - SEE SHEET 3.

- NOTES:
- 1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
 - 2. THE PARTIALLY INSULATED PROBE SHALL BE INSTALLED IN SUCH A WAY THAT IGNITION DUE TO HAZARDOUS ELECTROSTATIC CHARGES CANNOT OCCUR.
 - 3. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 - 4. USE COPPER WIRING ONLY.
 - 5. ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 250 VOLTS.
 - 6. NO REVISIONS TO THIS DOCUMENT WITHOUT FM APPROVAL.
 - 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED by		7	1-14-129	6/14/14	COPYRIGHT 2014	AMETEK® DREXELBROOK		ATEX CONTROL DRAWING FOR INTELLIPOINT SERIES ZONE [0] 1 OR 2 (INTEGRAL)	
PO #		6	1-06-216	THP	2-22-07	SCALE: NONE		215-874-1234 FAX 215-874-2731	
ENG		5	1-06-216	NOT RELEASED		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)		205 KEITH VALLEY RD HORSHAM, PA 19044-9986	
USER		4	11-02-202	SGA	11-27-02	DR. JUS 11-3-14		420-0004-146-CD	
ISS.	EDO/DSR	3	1-02-201	SGA	3-15-02	DATE		SHEET 1 OF 5	
DE #						APP'D		OF 7	

6.2 ATEX Drawings (Continued)



6.2 ATEX Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrst LEVEL PROBE

- m = FAMILY NO. 0 THROUGH 9, BLANK
 n = FAMILY NO. 0 THROUGH 9, BLANK
 o = 0 THROUGH 9, BLANK
 p = 0 THROUGH 9
 q = FAMILY NO. 0 THROUGH 9, BLANK
 r = FAMILY NO. 0 THROUGH 9, BLANK
 s = FAMILY NO. 0 THROUGH 9
 t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

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AMETEK DREXELBROOK	
SCALE	NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	
DR.	JJS 11-3-14
CK.	GF 11/5/14

CERTIFIED	
by _____	
PO #	_____
ENG	_____
USER	_____
DE #	_____

7	1-14-129	JJS	11/4/14
6	1-06-216	THP	2-22-07
5	1-06-216	NOT RELEASED	
4	11-02-202	SGA	1-27-02
ISS.	EDD/DSR NO.	APP'D	DATE

AMETEK®
DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2731

ATEX APPROVED
ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS
(REMOTE)

420-0004-146-CD

SHT. 5 OF 5
ISS. 7

NO. 420-0004-146-CD

SHT. 5 OF 5
ISS. 7

6.2 ATEX Drawings (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	
R	a	L	2	0	b	0	c	*	*	*	d	
	a											a = OPTIONS
												N = NO-CAL (STD)
												M = MANUAL SET POINT ADJUSTMENT
												H = HI SENSITIVITY
												G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT
					b							b = RELAYS
												1 = STANDARD RELAY
												2 = GOLD CONTACTS
							c					c = 0-4
												SENSING ELEMENTS
							0					700-1202-021 KEMA NO. Ex-00.E.2144 U
							1					700-1202-022 KEMA NO. Ex-00.E.2144 U
							2					700-1202-024 KEMA NO. Ex-00.E.2144 U
							3					700-1202-028 KEMA NO. Ex-00.E.2144 U
								*	*	*		SEE MOUNTING CHART
											d	d = A-F, H, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											H	36"/10" & 914.4mm/254mm
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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SCALE NONE UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)		PO # _____	
DR. JJS 11-3-14		ENG _____	
CK. <i>Id. Fubsky</i>		USER _____	
		DE # _____	

7	1-14-129	<i>MP</i>	11/4/14		ATEX APPROVED INTELLIPOINT MODEL NUMBERING SYSTEM (INTEGRAL)
6	1-06-216	THP	2-22-07		
5	1-06-216	NOT RELEASED			
4	11-02-202	SGA	1-27-02		
ISS.	EDO/DSR NO.	APP'D	DATE	205 KEITH VALLEY RD HORSHAM, PA 19044-9986	215-674-1234 FAX 215-674-2733

420-0004-146-CD

SHT. 3 OF 5
ISS. 7

6.3 ATEX Approval Certificate

420-0004-497		Sht. 1 of 4	APP'D BY SGA
ISSUE	EDO NO.	APP'D	DATE
1	2-15-113	SG	2.20.15



1 EC-TYPE EXAMINATION CERTIFICATE

- 2 Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 94/9/EC
- 3 EC-Type Examination Certificate No: FM14ATEX0049
- 4 Equipment or protective system: R*L2-***, R*L2-0***, R*T2-*0**, R*T2-00**, S*R*T2*0**, and S*R*T2-00** IntelliPoint RF Transmitter with Integral and Remote Sensor
(Type Reference and Name)
- 5 Name of Applicant: AMETEK Drexelbrook
- 6 Address of Applicant: 205 Keith Valley Road, Horsham, PA 19044 USA
- 7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.
- 8 FM Approvals Ltd, notified body number 1725 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3051517 dated 8th January 2015
- 9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0+A11:2013, EN60079-1:2007, EN60079-11:2012, EN 60079-26:2007, EN 60079-31:2013, EN 60529+A2:2013
- 10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- 11 This EC-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.



Mick Gower
certified Mick Gower, an FM Approvals Ltd.
certified Mick Gower, an FM Approvals Ltd.
certified
2015/01/23 15:59:21 Z

Mick Gower
Certification Manager, FM Approvals Ltd.

Issue date: 23rd January 2015

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

F ATEX 020 (Apr/14)

Page 1 of 4

6.3 ATEX Approval Certificate (Continued)

420-0004-497

Sht. 2
of 4ISSUE
1**SCHEDULE**

to EC-Type Examination Certificate No. FM14ATEX0049

- 12 The marking of the equipment or protective system shall include:

**IntelliPoint Transmitter with Remote Sensor**

II 2 (1) G Ex d [ia] IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 2 (1) D Ex tb [ia] IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**IntelliPoint Transmitter with Integral Sensor**

II 2 (1) G Ex d [ia] IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 2 (1) D Ex tb [ia] IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**IntelliPoint Two-Wire Transmitter with Remote Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**IntelliPoint Two-Wire Transmitter with Integral Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**SIL IntelliPoint Two-Wire Transmitter with Remote Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**SIL IntelliPoint Two-Wire Transmitter with Integral Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**700-*, IntelliPoint Sensors**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

- 13
- Description of Equipment or Protective System:**

The IntelliPoint RF Point Level System (RxLx) and IntelliPoint RF Two-Wire Point Level System (RxTx) consist of a transmitter, a 700 series level sensor and a 380 series connecting cable used for the remote version of the sensor. The system using the remote sensor may also include an RF filter. The transmitter provides intrinsically safe outputs to the sensing elements. It converts a capacitive level measurement into a relay contact signal. The 700 Series Sensors are passive devices having a capacitance of less than 1µF. The SIL version of the IntelliPoint RF Two-Wire Point Level System (SxTx) is identical in design to the RxTx.

Operation Temperature Ranges:

The ambient operating temperature range of the The IntelliPoint RF Point Level System (RxLx) and IntelliPoint RF Two-Wire Point Level System (RxTx) is -30°C to 70 °C. Process temperature range is -30°C to 230°C.

Electrical data:

The IntelliPoint RF Point Level System transmitter is powered by a maximum voltage of 250VAC and has a maximum power rating of 2.0W. The IntelliPoint RF Two-Wire Point Level System transmitter is powered by a maximum voltage of 30VDC and has a maximum power rating of 1.0W.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
 T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

6.3 ATEX Approval Certificate (Continued)

420-0004-497	Sht. of	3 4	ISSUE 1
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SCHEDULE



to EC-Type Examination Certificate No. FM14ATEX0049

Model Options:

RaL2-bcde. IntelliPoint Transmitter with Remote Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.
b = Cable Length: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, or K.
c = Relays: 1 or 2.
d, e = Sensor, Sensor housing, Spark Protector Assembly: 00 through 04, 06, 07, 09 through 20, 31 through 35, 50 through 55, 60 through 62, or ZZ.

RaL2-0bcd. IntelliPoint Transmitter with Integral Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.
b = Relays: 1 or 2.
c, d = Sensor, Cable: 00, 01, 02, or 03.

RaT2-b0cd. IntelliPoint Two-Wire Transmitter with Remote Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.
b = Cable Length: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, or K.
c, d = Sensor, Sensor housing, Spark Protector Assembly: 00 through 04, 06, 07, 09 through 20, 31 through 35, 50 through 55, 60 through 62, or ZZ.

Entity Parameters:

Vmax = 30V, Imax = 140 mA, Pi = 1 W, Ci = 0, Li = 145 µH

RaT2-00bc. IntelliPoint Two-Wire Transmitter with Integral Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.
b, c = Sensor, Cable: 00, 01, 02, 03, 04, 06, 07, 09, 11, 12, 13, 16, 17, 18, 19, 25, 26, 27, 28, or ZZ.

Entity Parameters:

Vmax = 30V, Imax = 140 mA, Pi = 1 W, Ci = 0, Li = 145 µH

SaRbT2c0de. SIL IntelliPoint Two-Wire Transmitter with Remote Sensor.

a = SIL Level: Option not evaluated by FM Approvals.
b = Calibration: N, M, H, G, L, T, V, or P.
c = Cable Length 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, or K.
d, e = Sensor, Sensor housing, Spark Protector Assembly: 00 through 04, 06, 07, 09 through 20, 31 through 35, 50 through 55, 60 through 62, or ZZ.

Entity Parameters:

Vmax = 30V, Imax = 140 mA, Pi = 1 W, Ci = 0, Li = 145 µH

SaRbT2-00cd. SIL IntelliPoint Two-Wire Transmitter with Integral Sensor

a = SIL Level: Option not evaluated by FM Approvals.
b = Calibration N, M, H, G, L, T, V, or P.
c, d = Sensor, Cable: 00, 01, 02, 03, 04, 06, 07, 09, 11, 12, 13, 16, 17, 18, 19, 25, 26, 27, 28, or ZZ.

Entity Parameters:

Vmax = 30V, Imax = 140 mA, Pi = 1 W, Ci = 0, Li = 145 µH

700-a. IntelliPoint Sensors.

a = Any 7 digit numeric combination maintaining the limits of 420-0004-146-CD or 420-0004-175-CD.

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FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

6.3 ATEX Approval Certificate (Continued)

420-0004-497	Sh. 4 of 4	ISSUE 1
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SCHEDULE



to EC-Type Examination Certificate No. FM14ATEX0049

14 Specific Conditions of Use:

None

15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 Test and Assessment Procedure and Conditions:

This EC-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

17 Schedule Drawings

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 Certificate History

Details of the supplements to this certificate are described below:

Date	Description
23 rd January 2015	Original Issue.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

6.3 CE Declaration of Conformity



205 Keith Valley Road, Horsham, PA 19044
 Telephone: 215-674-1234 Fax: 215-674-2731
 www.ametek.com www.drexelbrook.com



420-0004-176		Sht. 1 of 1	APP'D BY SGA
ISSUE	EDO NO.	APP'D	DATE
3	9-11-110	SGA	9-14-11
4	1-15-108	<i>SGA</i>	<i>1-30-15</i>

Declaration of Conformity

AMETEK DREXELBROOK
205 KEITH VALLEY ROAD
HORSHAM, PENNSYLVANIA
USA, 19044

We declare under our sole responsibility that the product **IntelliPoint Point Level**
 Measurement Systems Model Number RXLX Series which this declaration relates is in conformity
 with the following

standards and entitled to carry the CE Mark:

Product Type: Measurement, Control Equipment and Laboratory Use
Use following the provisions of the EMC Directive 2004-108-EC
Conforms to the requirements of:

Emissions requirements of:

EN61326-1:2006; Clause 7.2:

CISPR 11 Edition 4:2003 Radiated Emissions, Group 1, Class B

Immunity requirements of EN 61326-1:2006; Table 1

IEC 61000-4-2:2001 Electrostatic Discharge

IEC 61000-4-3:2002 Radiated Immunity

IEC 61000-4-4:2004 EFT/Burst. I/O leads

IEC 61000Q-4-5:2001 Surge Immunity, I/O leads

IEC 61000-4-6:2003 Conducted Immunity, I/O Leads

IEC 61000-4-8:1993, A1:2000 Power Frequency Magnetic Fields

Following the provisions of 94/9/EC ATEX Directives, Conforms to the requirements of:

EN 60079-0+A11:2013	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
EN 60079-1:2007	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
EN 60079-11:2012	Explosive atmospheres - Part 11: Equipment protection by Intrinsic safety "I"
EN 60079-26:2007	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga
EN 60079-31:2013	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
EN 60529+A2:2013	Degrees of protection provided by enclosures (IP Code)

EC-Type Examination Certificate Number FM14ATEX0049 Notified Body Number 1725

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK SL4 1RS

Steven G. Arnold
 Quality Assurance & Product Safety Manager
 Issue Date: 1/30/2015

SHT 1 OF 2

**FIGURE -D- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE ON FLEXIBLE
3-TERMINAL SENSING ELEMENT
700-0205-XXX.**

..APPROVED DRAWING..
 CHANGES TO THIS DRAWING
 REQUIRE AGENCY APPROVAL
 PER 440-0015-003
☐ FM ☐ CSA ☒ KEMA
☐ _____ 420-0004-017



205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

[illegible]

377-0001-019-CD

6.5 Mounting and Wiring for Spark Protector (Continued)

TYPICAL INSTALLATION OF
SPARK PROTECTORS

FIGURE -E- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE IN PARALLEL
WITH REMOTE VERIFY SWITCH.

FOR HI. TEMP APPLICATIONS REFER
TO 377-0001-016-CD.

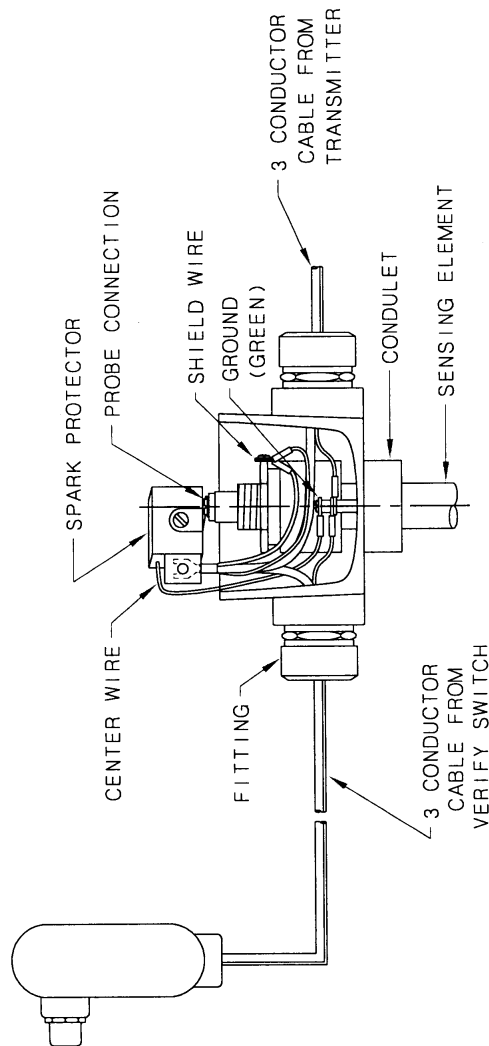


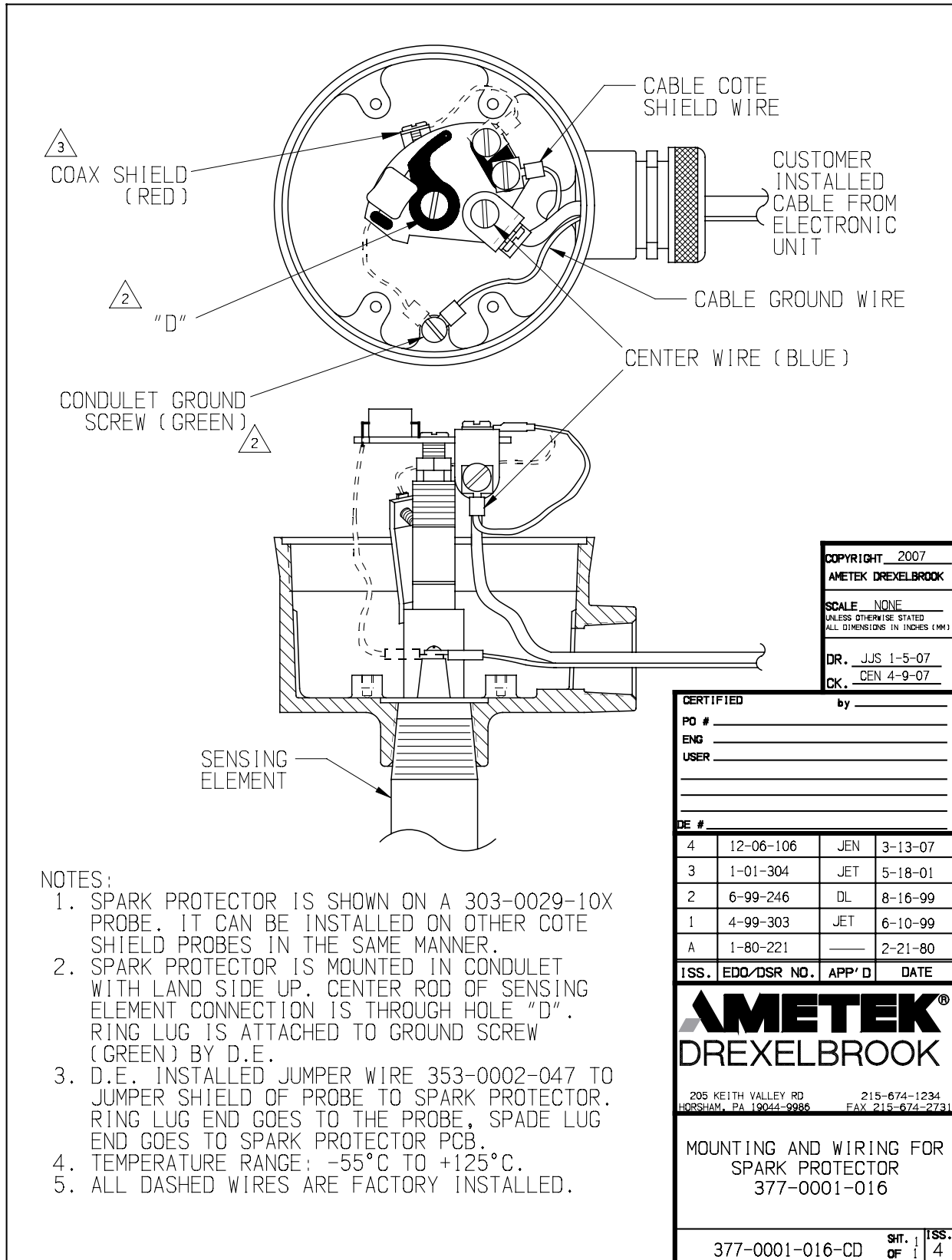
FIGURE -E-

NO. 377-0001-019

SHT 2 OF 2

CERTIFIED		by		COPYRIGHT 2004		AMETEK DREXELBROOK		377-0001-019 HEAVY DUTY SPARK PROTECTOR CUSTOMER CONNECTION MOUNTING & WIRING		SHT. 2 OF 2		ISS. 5		
PO #	5	2-04-336	CS	2-25-04	SCALE	NONE	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	205 KEITH VALLEY RD. HORSHAM, PA 19044-9986		377-0001-019-CD		SHT. 2 OF 2		
ENG	4	7-93-303	JET	5-25-93	DATE	8-31-92	DR.	CDW	215-874-1234 FAX 215-874-2731		SHT. 2 OF 2		ISS. 5	
USER	3	8-92-83	MPG	8-31-92	DATE	8-31-92	DR.	CDW	205 KEITH VALLEY RD. HORSHAM, PA 19044-9986		SHT. 2 OF 2		ISS. 5	
ISS.	3	8-92-83	MPG	8-31-92	DATE	8-31-92	DR.	CDW	205 KEITH VALLEY RD. HORSHAM, PA 19044-9986		SHT. 2 OF 2		ISS. 5	
DE #														

6.5 Mounting and Wiring for Spark Protector (Continued)

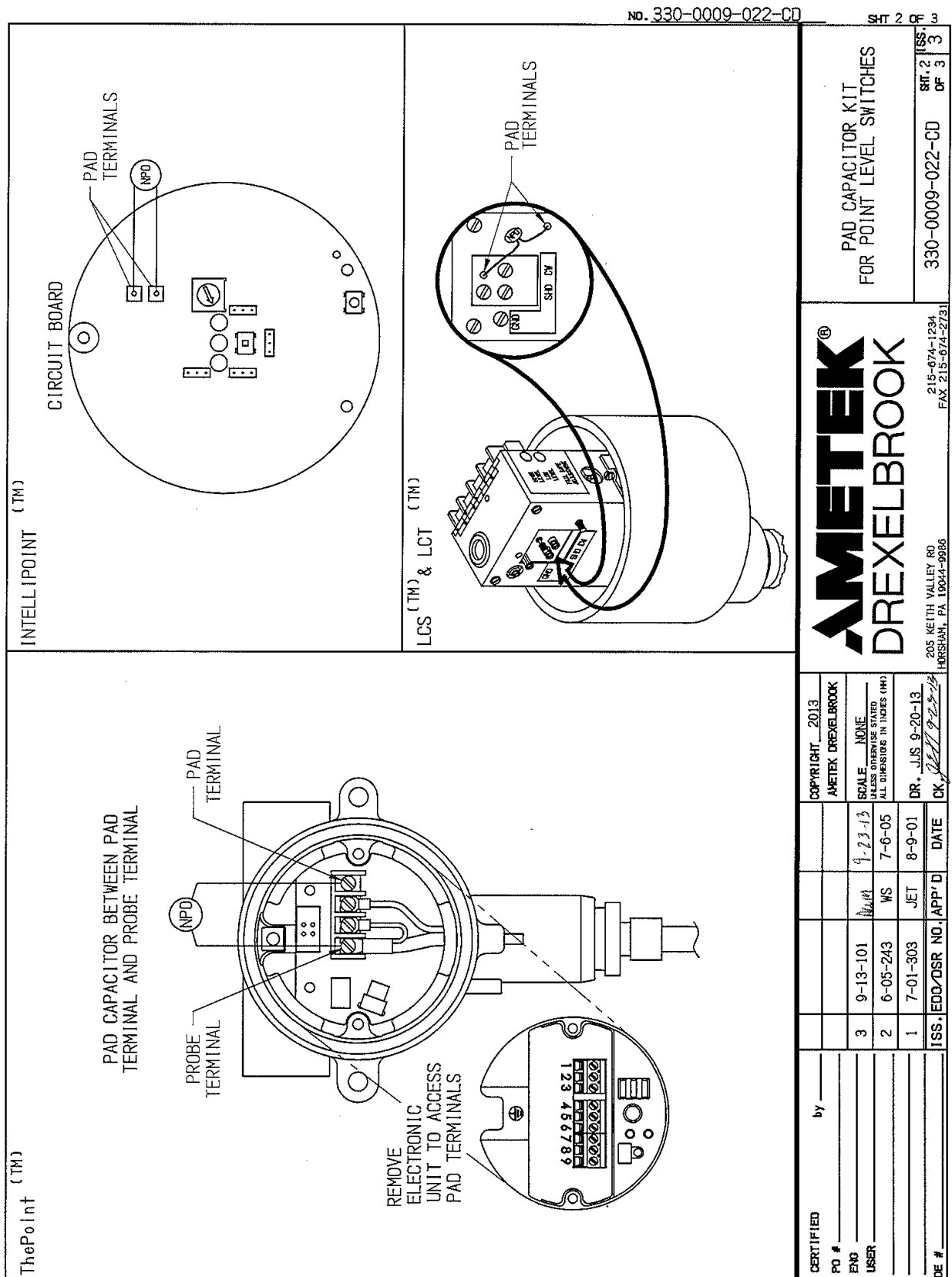


SHT 1 OF 3

NOTE: ON SOME TRANSMITTERS, THE PAD CAPACITOR IS SOLDERED TO TURRETS. OTHER TRANSMITTERS ATTACH THE LEADS UNDER SCREWS.

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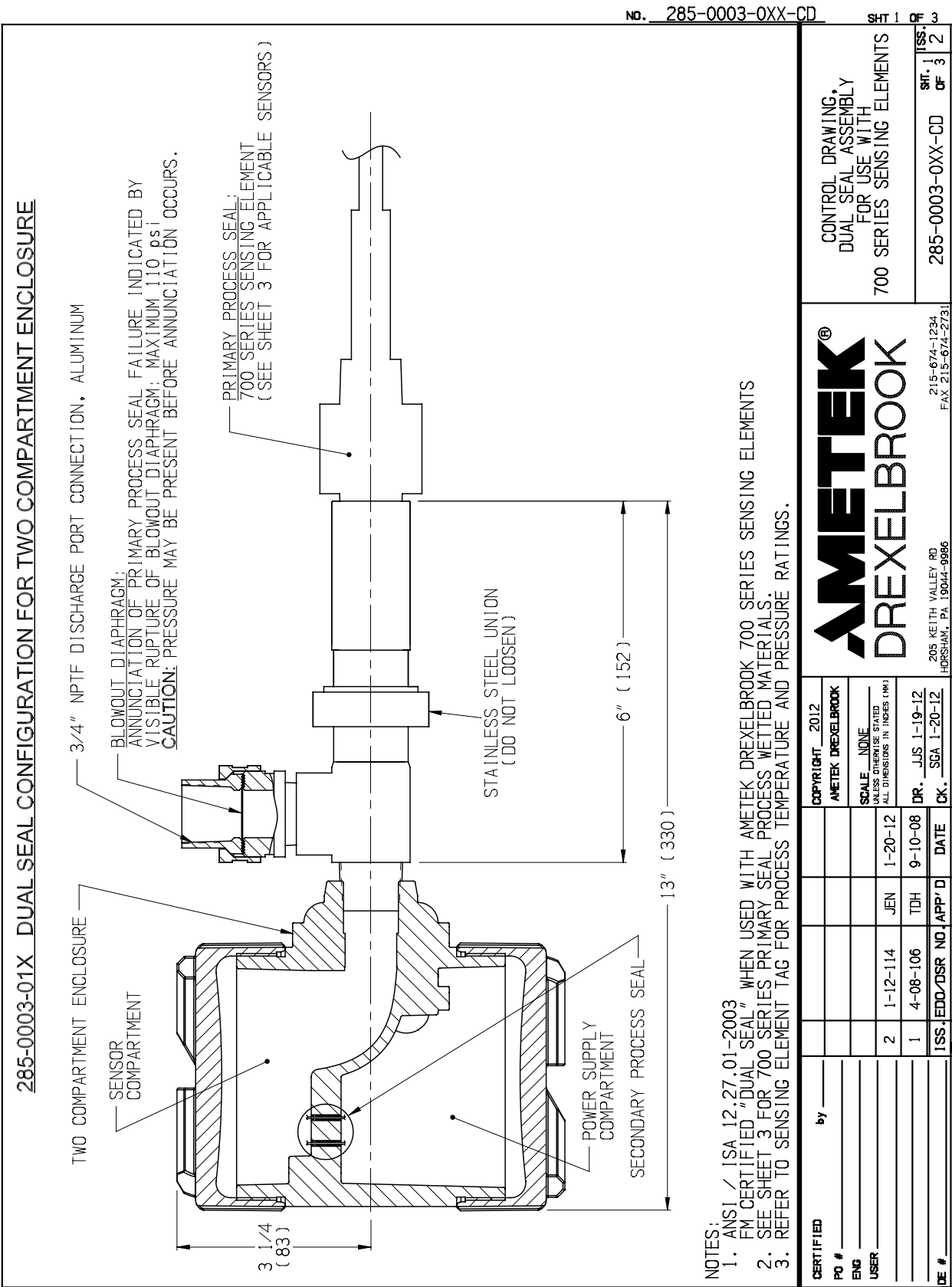
6.6 Adding a Padded Capacitor (Continued)



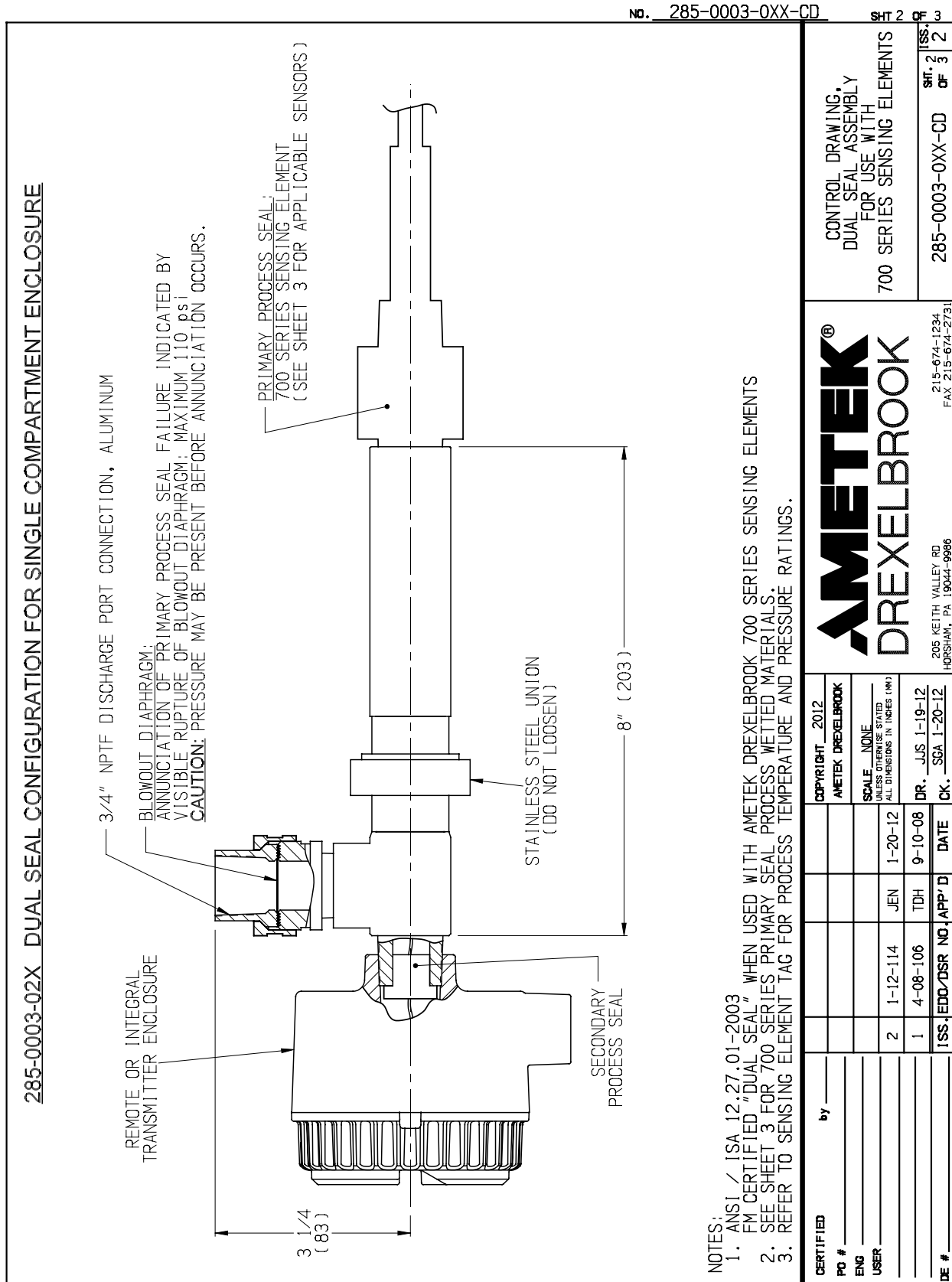
SHT 3 OF 3

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6.7 Dual Seal Assembly for 700 Series Sensing Elements



6.7 Dual Seal Assembly (Continued)



6.7 Dual Seal Assembly (Continued)

NO. 285-0003-0XX-CD

SHT 3 OF 3

SENSING ELEMENTS AVAILABLE

	SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
	700-0001-022	TFE/316SS
	700-0001-024	TFE/316SS
	700-0001-026	TFE/316SS
	700-0001-034	TFE/Cs
	700-0001-040	POLYETHYLENE/316SS
	700-0001-044	PFA/316SS
	700-0001-054	TFE/316SS
	700-0001-064	TFE/316SS
	700-0001-074	TFE/316SS
	700-0001-344	PFA/316SS
	700-0002-023	TFE/316SS
	700-0002-024	TFE/316SS
	700-0002-027	FEP/TFE/316SS
	700-0002-028	TFE/316SS
	700-0002-033	TFE/316SS
	700-0002-037	PVDF/TFE/316SS
	700-0002-040	UHMW PE/SILICONE/316SS
	700-0002-044	PVDF/TFE/316SS

	SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
	700-0002-054	FEP/TFE/316SS
	700-0002-057	PVDF/TFE/316SS
	700-0002-064	PVDF/TFE/316SS
	700-0002-224	TFE/316SS
	700-0002-321	FEP/TFE/316SS
	700-0002-360	PFA/TFE/316SS
	700-0005-054	PFA/TFE/316SS
	700-0201-005	TFE/316SS
	700-0201-025	TFE/316SS
	700-0201-026	TFE/316SS
	700-0201-027	TFE/316SS
	700-0201-028	TFE/316SS
	700-0201-035	TFE/316SS
	700-0201-051	TFE/316SS
	700-0201-052	TFE/316SS
	700-0201-058	TFE/316SS
	700-0201-059	TFE/316SS
	700-0202-002	TFE/316SS

	SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
	700-0202-053	TFE/316SS
	700-0202-054	TFE/316SS
	700-0202-056	TFE/316SS
	700-1202-001	PEEK/316SS
	700-1202-010	PEEK/316SS
	700-1202-014	PEEK/316SS
	700-1202-015	PEEK/316SS
	700-1202-018	PEEK/316SS
	700-1202-031	PEEK/316SS
	700-1202-033	PEEK/316SS
	700-1202-041	PEEK/316SS
	700-1202-045	PEEK/316SS
	700-1202-051	PEEK/316SS
	700-1202-055	PEEK/316SS
	700-1202-061	PEEK/316SS
	700-1202-081	PEEK/316SS
	700-9100-403	PEEK/316SS
	700-9100-404	PEEK/316SS

[illegible]

Appendix: A

Appendix A: Shortening or Lengthening the Sensing Element



CAUTION:

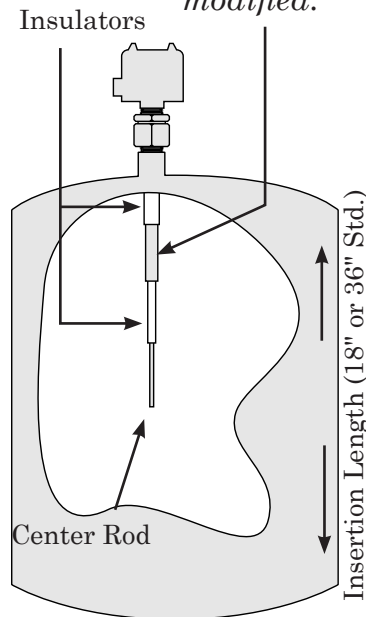
*The insulation length of either **Flush Sensing Elements** or **Insulated Sensing Elements** can **NOT** be changed. **Cable Sensing Elements** can only be shortened. Instructions are included with each unit.*

The Need

Sometimes your application calls for probe lengths other than the standard 18-inch or longer insertion lengths supplied. Shortening the sensing element is quite simple and can be done in the field. Lengthening the sensing element, however, is more difficult because the metal rod, typically 304 SS or 316 SS, must be welded.

NOTE:

*Cote-Shield element must **NEVER** be modified.*



Before making any Adjustments:

- 1) Read the following instructions thoroughly.
- 2) Remove power.
- 3) Disconnect the electronics.
- 4) Protect electronics from any static discharge.
- 5) Protect electronics from any heat.

Shortening

The bare metal center rod of the sensing element can be shortened with a hacksaw. Be careful not to cut either of the two insulators. See Figure on this page.

In applications using conductive or water-based materials, shortening is not a problem. Leave a minimum bare metal center rod length of two (2) inches.

For dry granular materials, such as powder, sand, corn, clinker, etc., you must leave a minimum bare metal center rod length of eight (8) inches. Consult the factory before shortening beyond this point.

Lengthening

To lengthen the sensing element, an extension rod can be welded onto the end of the bare metal center rod. Make sure that the extension rod is the same metal as the sensing element.

An alternate option is to add a pipe coupling and a section of metal pipe after threading the tip of the sensing element. In this case, the metal pipe need not be identical to the metal of the sensing element.



Any changes to probe length after calibration requires re calibration to ensure proper operation.

CE Installation Supplement

Purpose: To provide additional information that is required to be in compliance with the CE mark of conformity and EMC Directive 2004-108-EC

Definitions:

1. I/O Sensor/Measurement/Control Port – Any port which provides level measurement, control, and/or DC power.
2. I/O AC Power – Any port which provides AC main power to the instrument.
3. Housing – Any enclosure where the sensor and transmitter can be located.
4. Non-metallic applications – any application where the sensor is not surrounded by a metallic surface.

Installation Specifics:

1. I/O Sensor/Measurement/Control Ports
 - Wiring must be twisted pair and run in conduit or an equivalent shielded environment (i.e. shielded braid, cable, etc.).
 - The shield terminations must be grounded at the source and destination ports.
 - Wiring must be run separate from AC main power and/or any signal exceeding 75 volts DC or 50 volts AC.
2. I/O AC Power Port
 - Wiring must be run either in conduit or an equivalent shielded environment (i.e. shielded braid, cable, etc.).
 - The shield terminations must be grounded at the source and destination ports.

CE Installation Supplement (Continued)

3. Remote Installations

- Sensor port must be connected to the transmitter port by one of the following means:
 - 401-16-2 Probe Filter
 - Coaxial cable run in conduit
 - Triaxial cable

4. Housings

- All installations require the sensor and transmitter to be located in a closed shielded/metal housing (i.e. typically explosion-proof or weatherproof housings meet this requirement)

5. Sensor Type/Mounting

- In all non-metallic applications the sensor must have a full concentric shield (i.e. needs to be considered when ordering).
- The sensor/sensor conduit must be grounded locally either to a metal support structure or an equivalent earth ground.

- Comments:
- Any deviation from these installation requirements should be reviewed with factory, prior to implementation
 - These instructions are essential to insure conformity with specified EC directives

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QUOTATIONS: Written quotations are valid for thirty (30) days unless otherwise stated. Verbal quotations expire the same day they are made.

PRICES: All prices and terms are subject to change without notice. Buyer-requested changes to its order ("Orders"), including those affecting the identity, scope and delivery of the goods or services, must be documented in writing and are subject to Seller's prior approval and adjustments in price, schedule and other affected terms and conditions. Orders requiring certified test data in excess of commercial requirements, are subject to a special charge.

ORDER ACCEPTANCE: All Orders are subject to final approval and acceptance by Seller at its office located at 205 Keith Valley Road, Horsham, Pennsylvania 19044.

TERMS OF PAYMENT: Seller's standard terms of payment for Buyers who qualify for credit are net thirty (30) days from date of invoice. All invoices must be paid in United States dollars.

CREDIT: Seller reserves the right at any time to revoke any credit extended to Buyer or otherwise modify terms of payment if Buyer fails to pay for any shipments when due or if in Seller's opinion there is a material adverse change in Buyer's financial condition. Seller may, at its option, cancel any accepted Order if Buyer fails to pay any invoices when due.

DELIVERY: Shipments are F.O.B place of manufacture ("Shipping Point") and the Buyer shall pay all freight, transportation, shipping, duties, fees, handling, insurance, storage, demurrage, or similar charges from Shipping Point. Delivery of goods to common carrier shall constitute delivery and passing of title to the Buyer, and all risk of loss or damage in transit shall be borne by Buyer. Any claims or losses for damage or destruction after such delivery shall be the responsibility of Buyer.

Seller reserves the right to make delivery in installments which shall be separately invoiced and paid for when due, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Buyer of its obligation to accept remaining deliveries.

Acknowledged shipping dates are approximate only and based on prompt receipt of all necessary information from Buyer and Buyer's compliance with terms of payment.

TAXES: All sales, excise and similar taxes which Seller may be required to pay or collect with respect to the goods and/or services covered by any Order, shall be for the account of the Buyer except as otherwise provided by law or unless specifically stated otherwise by Seller in writing.

TERMINATION AND HOLD ORDERS: No Order may be terminated by Buyer except upon written request by Buyer and approval by Seller, and if said request is approved by Seller, under the following conditions: (1) Buyer agrees to accept delivery of all of the units completed by Seller through the workday on which Seller receives the written termination request; (2) Buyer agrees to pay to Seller all direct costs and expenses applicable to the portion of the Order that is incomplete.

WARRANTY:

A. Hardware: Seller warrants its goods against defects in materials and workmanship under normal use and service for one (1) year from the date of invoice.

B. Software and Firmware: Unless otherwise specified, Seller warrants for a period of one (1) year from date of invoice that standard software or firmware, when used with Seller specified hardware, shall perform in accordance with Seller's published specifications. Seller makes no representation or warranty, expressed or implied, that the operation of the software or firmware shall be uninterrupted or error-free, or that functions contained therein shall meet or satisfy the Buyer's intended use or requirements.

C. Services: Seller warrants that services, including engineering and custom application, whether provided on a fixed cost or time and material basis, shall be performed in accordance with generally accepted industry practices.

D. Remedies: Seller's liability under this section is restricted to replacing, repairing, or issuing credit (at Seller's option) for any returned goods and only under the following conditions: (1) Seller must be promptly notified, in writing, as soon as possible after the defects have been noted by the Buyer, but not later than (1) year from date of invoice from Seller; (2) The defective goods are to be returned to the place of manufacture, shipping charges prepaid by the Buyer; (3) Seller's inspection shall disclose to its satisfaction that the goods were defective in materials or workmanship at the time of shipment; (4) Any warranty service (consisting of time, travel and expenses related to such services) performed other than at Seller's factory, shall be at Buyer's expense.

E. Repaired/Reconditioned Goods: As to out-of-warranty goods which Seller has repaired or reconditioned, Seller warrants for a period of sixty (60) days from date of its invoice only new components replaced in the most recent repair/reconditioning.

F. Returns and Adjustments: No goods may be returned unless authorized in advance by Seller and then only upon such conditions to which Seller may agree. Buyer must obtain an RMA (Return Material Authorization) number from Seller prior to any return shipment and such RMA number must appear on the shipping label and packing slip. Buyer shall be responsible for the returned goods until such time as Seller receives the same at its plant and for all charges for packing, inspection, shipping, transportation, or insurance associated with returned goods. In the event that credit for returned goods is granted, it shall be at the lesser of the then current prices or the original purchase price. Claims for shortage or incorrect material must be made within five (5) days after receipt of shipment.

ALL OTHER WARRANTIES, FOR ANY OF SELLER'S GOODS OR SERVICES, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE ARE EXCLUDED.

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PACKAGING/WEIGHTS AND DIMENSIONS: Buyer specified packing or marking may be subject to additional charges not otherwise included in the price of the goods. Published weights and dimensions are estimates or approximate only and are not warranted.

FORCE MAJEURE: Seller shall not be responsible for delays in delivery or any failure to deliver due to causes beyond Seller's control, including but not limited to the following items: acts of God, war, terrorism, mobilization, civil commotion, riots, embargoes, domestic or foreign governmental regulations or orders, governmental priorities, port congestion, acts of the Buyer, its agents or employees, fires, floods, strikes, lockouts and other labor difficulties, shortages of or inability to obtain shipping space or transportation, inability to secure fuel, supplies or power at current prices or on account of shortages thereof, or due to limitations imposed by the extent of availability of Seller's normal manufacturing facilities.

If a delay excused per the above extends for more than ninety (90) days and the parties have not agreed upon a revised basis for continuing providing the goods or services at the end of the delay, including adjustment of the price, then Buyer, upon thirty (30) days' prior written notice to Seller may terminate the Order with respect to the unexecuted portion of the goods or services, whereupon Buyer shall promptly pay Seller its reasonable termination charges upon submission of Seller's invoices thereof.

LIMITATION OF LIABILITY: Seller's liability for any claim of any kind, except infringement of intellectual property rights, shall not exceed the purchase price of any goods or services which give rise to the claim. **SELLER SHALL IN NO EVENT BE LIABLE FOR BUYER'S MANUFACTURING COSTS, LOST PROFITS, LOSS OF USE OF THE GOODS OR SERVICES, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS, CLAIMS OF BUYER'S CUSTOMERS FOR DAMAGES, OR OTHER SPECIAL, PROXIMATE, INCIDENTAL, INDIRECT, EXEMPLARY OR CONSEQUENTIAL DAMAGES.** Any action against Seller must be brought within eighteen (18) months after the cause of action accrues. These disclaimers and limitations of liability shall apply regardless of the form of action, whether in contract, tort or otherwise, and further shall extend to the benefit of Seller's vendors, appointed distributors and other authorized resellers as third-party beneficiaries.

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SEVERABILITY AND ENTIRE AGREEMENT: If any provision of these terms and conditions is unenforceable, the remaining terms shall nonetheless continue in full force and effect. This writing, together with any other terms and conditions Seller specifically agrees to in writing, constitutes the entire terms and conditions of sale between Buyer and Seller and supercedes any and all prior discussions, and negotiations on its subject matter.



205 Keith Valley Road, Horsham, PA 19044
Telephone: 1 215-674-1234
Fax: 1 215-674-2731
E-mail: drexelbrook.service@ametek.com
Website: www.drexelbrook.com